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## ORIGINAL ARTICLES

### THE DIAGNOSIS OF GRAVES' DISEASE.*


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Graves' disease with tachycardia, goiter and exophthalmos presents a striking and palpable picture. The disease may be recognized iconographically and affords no opportunity for diagnostic perspicacity. With either goiter or exophthalmos absent the diagnosis is still easy if one but take the trouble to look at the patient and feel the pulse. Difficulties of diagnosis arise only when both goiter and prominence of the eyes are wanting or are so slight as to be dubious. In the absence of tachycardia the diagnosis can not be made at all. If the pulse be normal the most one can do is to suspect that the case may be an incipient one of Graves' disease.

In short, all difficulties of diagnosis relate to the incipient or abortive cases, the so-called *formes frustes*.[1] Concerning these forms I wish to submit four postulates:

1. In some cases it is possible to make the diagnosis only after continued observation.

2. In the absence of a specific test (serum or other) there are some cases which can be proven neither to be nor not to be cases of exophthalmic goiter.

3. If we assume that *formes frustes* may recover without having progressed to the fully developed disease, the diagnosis in some such cases never can be settled.

4. If the abortive forms do not frequently permanently regress or permanently remain in the abortive stage, then the diagnosis of exophthalmic goiter is made much too frequnetly by believers in the simpler forms of "hyperthyroidism" and their identity with Graves' disease.

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* Part of a Symposium on Exophthalmic Goiter before the Illinois State Medical Society, May 20, 1909.

1. *Fruste* is a term borrowed from numismatics, meaning worn or washed away, indistinct, blurred, defaced or deformed.

That many of these milder cases do recover under one treatment or another is common experience and the painstaking investigations of Stern[2] seem to show that the *formes frustes* generally tend to remain as such and either recover or run on for years with no great change in type.

In the diagnosis of Graves' disease as a practical procedure I think it best to divest ourselves of all conception or opinion as to the nature of the disease. For investigation and research hypothesis is necessary. For action theories frequently are essential. But to start out to make a diagnosis in accord with a given hypothesis or theory is not only unscientific —it is unfruitful or worse. To state the proposition in another way, we must be guided simply by the signs and symptoms as we have learned to know them. In short, our diagnosis rests on symptomatology.

As already stated, with the three cardinal symptoms present the diagnosis makes itself. With either exophthalmos or goiter absent the diagnosis is easy. When of the triad only tachycardia is present the diagnosis may be difficult, but ordinarily it is not so if the observer carefully looks for other less constant and less diagnostic conditions, signs and symptoms which, with the increased pulse rate, make a familiar clinical picture.

### CIRCULATORY SIGNS.

Tachycardia is, beyond all others, the most important symptom. I feel like saying no tachycardia, no Graves' disease. And it is the more distinctive because it is constant. Cases in which rapid pulse is present only on excitement, or after exertion, or when the patient is nervous, or which in any way is intermittent or paroxysmal are very rarely indeed cases of exophthalmic goiter. On this point I entirely agree with Oppenheim and disagree with Kocher, who considers an easily produced but inconstant tachycardia characteristic of the disease. To determine whether or no the tachycardia is constant, observation with the patient entirely at rest and devoid of excitement may be necessary. While the high pulse rate is constant, it is true that exacerbations of the tachycardia, episodes of violent palpitation, and even delirium cordis do occur.

Other frequent signs relating to the circulation are throbbing of arteries, especially in the neck; feeling of palpitation of the heart, constant or at irregular intervals, and a marked disproportion between the precordial impulse and the pulse at the wrist. This last sign is worthy of special note, as it is more marked in Graves' disease than in any other malady except perfectly obvious cases of organic heart disease. To feel a pounding, heaving cardiac impulse with a thin, compressible pulse in the absence of a heart lesion is a truly striking finding. Cardiac hypertrophy is sometimes observed, but it bears no necessary relation to the degree or duration of the tachycardia. Of course, valvular disease or myocarditis may be a complication, but one must be guarded in drawing conclusions from a heart murmur. A cardiac bruit, especially systolic, is no unusual sign of Graves' disease, and what seemed to be a murmur

2. Richard Stern. Differentialdiagnose und Verlauf des Morbus Basedowii und seiner unvolkommenen Formen. Leipzig und Wien, 1909.

of organic origin may disappear with the patient's improvement. Under this head may be mentioned pulsation of the liver or spleen (Gerhardt) and epistaxis.

Closely related to the cardiac signs are the pulmonary ones. More or less dyspnea is frequent, tachopnea is not rare and many patients complain of a short, dry cough or coughing spells.

### GOITER.

Enlargement of the thyroid is seldom absent throughout (is practically constant in children), but the size of the goiter has but little to do with the diagnosis. One lobe or both may be enlarged, generally it is soft, of uniform consistence, and apt to fluctuate in size. Not rarely the gland pulsates, sometimes a thrill may be felt, and frequently a bruit may be heard, especially over the upper part of the right lobe, a sign quite exceptional in other goiters. As is well known, Graves' disease may develop in an individual who for years has had ordinary goiter, in which case the former physical features of the goiter may change but little or not at all.

### EXOPHTHALMOS.

This is less constant than the goiter, ordinarily, though not always, symmetrical, and may be of any degree. Protrusion sufficient to prevent complete closure of the lids and proper protection of the eyeball is not rare, and even prolapse of the globe from the orbit has been reported.

### TREMOR.

Tremor should be known as the fourth cardinal sign, as it nearly always is present. It is fine, vibratory, 8 to 10 per second, generally affects the hands most, but may be more marked in the trunk, in which case it is best recognized by the hand placed on the patient's head or shoulder. Intensity of the tremor is variable, increased by excitement and exertion, and sometimes from no obvious cause. (Fluctuation of toxemia?)

### NERVOUS AND PSYCHIC SYMPTOMS.

Could there be a fifth cardinal symptom it would be "general nervousness"—indefinite as the term is. Sometimes this is the only complaint brought to the physician. Indeed, these are the cases apt to go unrecognized because of insufficient care and persistence in examination. The patient shows nervous instability, is easily upset, easily startled, easily worried; there is increased emotivity, irritability, rarely unnatural cheerfulness. She complains of poor concentration and forgetfulness, is restless, fidgety, hasty and notionate. More or less insomnia is the rule, although sleep may be normal and undue somnolence has been observed. Most authors emphasize the altered mental state, but, aside from such changes as those just indicated, mental derangement, in my experience, is altogether exceptional. True psychoses do occur, but there is no distinctive type. It is worthy of note that they are *not* of the type known to be of toxic origin.

### VITALITY AND NUTRITION.

Myasthenia in some degree is seldom lacking. The patient tires easily and feels weak, and I believe that some of the symptoms which have been individualized, such as the Bryson symptom (diminished chest expansion), the Moebius sign, weakness of ocular muscles, sudden giving way of the legs and paraparesis, are really only evidences of unusual asthenia. The general nutrition nearly always suffers. Patients frequently lose weight in the most unaccountable way, even when eating well and in the absence of any obvious gastro-intestinal trouble. Queerly enough, they sometimes put on flesh in the same inexplicable fashion.

Although many patients look anemic, sometimes cachectic, anemia can not be said to be a symptom of the disease. Red cells are normal and hemoglobin practically so. The mononuclear leucocytes generally are increased and the eosinophiles not infrequently so.

As a rule the temperature is normal, but in fulminant cases it may reach 103°, or even higher, the course of the case almost resembling that of acute miliary tuberculosis.

### OTHER EYE SIGNS.

A good many of the confirmatory signs relate to the eyes. Failure of the upper lid to follow the globe as the patient looks from above downward (Graefe), failure of the lower lid to follow upward rotation, weakness of convergence (Moebius), infrequent winking (Stellwag) or the reverse, retraction of the upper lid (Graefe, Stellwag), failure of the eyebrows to rise when the patient looks upward, swelling of the eyelids, a fine vibratory tremor of the eyeballs, pulsation of retinal arteries, are the most frequent. Ocular palsies are rare.

### TROPHIC, VASOMOTOR AND GLANDULAR SYSTEMS.

Vasomotor or allied disorders of some sort are almost uniformly present. Nearly every patient sweats too much, either paroxysmally or steadily, and hot flushes are frequent. A feeling of heat, as if the patient had fever, is not exceptional. Red blotches appear spontaneously on the face, neck or body, and slight rubbing or scratching quickly shows the presence of dermographia. The combination of pink or red flush with a moist skin contributes much to the characteristic facies.

Pigmentation of the skin is common, but may have to be looked for about the nipples or waist, or in the axillæ. Leucoderma, scleroderma and excessive lacrymation are less frequent. Local edema is not rare. The cervical glands often are swollen.

The urine is frequently increased in quantity (polyuria). Sugar is rare, albuminuria is not very rare, but whether or no it is to be regarded as a symptom of the disease is doubtful. Diminution of electric resistance is the rule, but this is now known to be due to the hyperidrosis. Hyperidrosis may be local.

Though out of place, it may here be noted that menstrual disorder is frequent. Menstruation may be excessive, scanty, painful or simply irregular.

### GASTROINTESTINAL TRACT.

Watery diarrhea is such an ordinary symptom as to be of decided diagnostic value. It may be so profuse, frequent or prolonged as to be grave. Anorexia is rather the rule, but bulimia has been observed. In bad cases there may be vomiting, generally in connection with acetonemia.

### DIFFERENTIAL DIAGNOSIS.

In the time at my disposal it is quite impossible to take up the numerous questions of differential diagnosis. For instance, Sarbo reports a case in which it was impossible to decide between Graves' disease and a tumor or abscess at the base of the brain. Such a dilemma is rare and indeed real difficulty need not occur often. As Sir William Jenner was wont to remark, more mistakes are made from not looking than from not knowing. If we keep in mind the above-noted symptomatology and carefully observe our patient we shall seldom be at fault. The following brief addenda are offered, not as instructive, but as possibly suggestive:

Difficulties of diagnosis most frequently occur in young women or girls who are nervous and run down. Many such patients have chlorosis, in which event a blood examination will settle the question at once. Others are not chlorotic, but are nervous, sweat easily, especially on excitement, and on examination show tremor of the hands and a rapid pulse. These are neurotic individuals, generally of rather low vitality, naturally unstable. In these people a goiter is no great rarity. But repeated examination under favorable conditions will show that the tachycardia is not constant, that when the patient is tranquil the tremor has quite or nearly disappeared, and that the sweating likewise occurs only during excitement or embarrassment. Many girls at puberty develop a soft goiter and are nervous. Some of those have Graves' disease, but most of them have not. Constant tachycardia and the other concomitant signs are absent.

Tuberculosis should no longer mislead us, for not only will the accessory signs and symptoms of Graves' disease be absent, but any case of tuberculosis which will cause tachycardia, tremor and nervousness will easily be recognized by the thermometer, examination of the chest, inspection of sputum and use of tuberculin.

Subjects of psychasthenia, neurasthenia, and hysteria are nervous, have palpitation, often tremor and complain of weakness or prostration. All of these maladies have their own peculiar features. The microscopic self observation and analysis, phobias and sensory distresses of the first two, the impressionability and stigmata of the last are foreign to Graves' disease. The palpitation is always intermittent and the myasthenia is more apparent than real.

In myasthenia gravis we find true and very marked fatigueability of muscles, but there is no constant tachycardia, certain muscular groups are predominantly affected and the so-called myasthenic reaction to faradism fixes the diagnosis.

Heart disease is not often mistaken for exophthalmic goiter, but the reverse sometimes happens when the heart symptoms are prominent, especially if a murmur is to be heard. Generally careful search will reveal other signs of Graves' disease and the absence of so-called secondary symptoms of cardiac disease, such as venous stasis, edema, hepatic enlargement, fluid in the serous cavities. In the latter, too, the effect of active exercise on pulse and respiration are more marked than in the former, except in the very advanced and the fulminant cases of Graves' disease, in which cases the diagnosis is easy. Needless to say, the renal involvement and change in blood pressure so frequently found in heart disease are wanting in exophthalmic goiter.

Occasionally a simple goiter which is very large or which grows backward may cause pressure on the cervical sympathetic and cervical veins, and perhaps on the trachea as well. The result may be some exophthalmos, dyspnea, vasomotor changes about the face and some weakness. But the tachycardia is wanting, the exophthalmos and vasomotor disorder are generally unilateral and the general symptoms of Graves' disease are lacking.

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## THE MEDICAL TREATMENT OF EXOPHTHALMIC GOITER.*

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The many theories advanced at one time or another concerning exophthalmic goiter have greatly enriched its therapeutic aspects, but the criticism, I think, may be made in all fairness that of the numerous remedies suggested only a select few seem rational, while many are of doubtful value and others again deserving of frank condemnation. In the light of most recent and ambitious research it would appear that we need take into account in our modern therapeutic conception of this disease little else than a consideration of the efficacy of bed rest and serums, on the one hand, and bed rest with surgical intervention, on the other. In respect, however, to the broader caption of this paper a few references to symptomatic measures, electro- and organo-therapy, are included. The surgical aspect with or without rest régime will receive separate consideration in this symposium.

Eulenberg has probably been the staunchest protagonist of the medical treatment of exophthalmic goiter. Influenced by his six hundred carefully recorded cases, he has felt no hesitancy in stating that the disease is not even to be regarded as debatable borderland, but for the present must remain "upon the certain ground of internal medicine, and only under most absolute necessity should we swerve to the surgical side." With an entirely unsatisfactory knowledge of the pathogenesis

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* Read as part of a Symposium on Exophthalmic Goiter at the annual meeting of the Illinois State Medical Society, Quincy, May 20, 1909.

of this disease and our failure to arrive at a better clinical valuation of thyroidism as it masquerades in its abortive, aberrant, subtoxic and hypertoxic forms, this conservative attitude seems commendable. And yet in the light of increasingly convincing surgical statistics of a most favorable kind Eulenberg may recede from his original position.

*Bed Rest.*—Consistent with my first suggestion, I shall briefly allude to the advantages of bed rest alone, for, after all is said, it is probably the essential, if not the sole, rational *medical* treatment for this disease. The neurologist frequently encounters exophthalmic goiter in its very incipiency, when the patient complains of general nervousness, an indefinable sense of precordial distress, consciousness of the heart beat, discomfort after eating, excessive sweating, quick fatigue and sleeplessness. In the presence of these symptoms alone, irrespective of the more significant tachycardia, tremor, enlarged gland and eye signs, the condition of thyroidism should always be well borne in mind. If properly estimated, it is of first importance to relieve the patient so far as possible of undue anxieties and cares and urge a withdrawal from the premises in which these are created. Wherever it is possible a complete, not a comparative rest, should be advised. I do not believe in yielding to a compromise in this matter, even at the time of earliest onset, unless I am convinced that the urgent need of the individual demands attendance upon work. If a loss in weight has been sustained, a diet of milk and nutritious food, largely vegetarian, should be encouraged, but flatulency must be avoided, or, at best, controlled. Tea and coffee should be allowed in great moderation, but alcohol and tobacco absolutely interdicted. The patient's life should be kept free from excesses and strenuous activities of all kinds, such as riding horseback, rowing, dancing, etc. It is very difficult at times to enforce obedience in these matters, but the importance of good habits and strict deportment from the very first is the better appreciated if one notes how quickly and unfavorably these patients react to nearly all external stimuli the least out of the ordinary.

For the tachycardia and nervous phenomena, with or without other symptoms, I know of no régime so satisfactory as a complete rest, after the fashion ensured by the Weir Mitchell method. The advice to take rest is more honored in the principle than in the practice, and I have found due emphasis on this point very worth while. Depending upon the severity of the symptoms, I ask of patients that they go to bed for three months at least, and probably much longer. Patients so advised at once grow accustomed to the idea and with quick adaptation are less unhappy about it than when told in an uncertain and vague way to just go to bed for a while. Details, I think, need not be gone into, except to add that rest does not mean sitting up for meals, going to the toilet, being propped up to read and write by the hour, and probably walk around the room a bit to stretch tired limbs or relieve a weary back. When the cases are even moderately severe patients must learn to remain passive, should be fed, raised, turned, moved and entertained. The underlying principle is one of a recumbent posture, with

some diversion for the mind, but little or none of an active sort for the body. Prolonged bed rest alone has greatly improved many a sufferer from thyroidism, and I think it is not too much to say that if early resorted to, even in the mild cases, a permanent abeyance of the symptoms is possible of attainment. I have in my own limited experience known patients to be free from relapses for so long an interval as six years, and could quote still longer periods of remission (if such they are) from the literature.

With a fairly good knowledge of the rest cure, pure and simple, upon the technic of which, however, so much depends, the results in the average cases should prove gratifying.

SERA.

The theory of hyperthyroidism put forward a number of years ago afforded an incentive for those interested in serologic investigations to produce a serum intended to neutralize the effects of hypersecretion from an overly active gland—in short, to introduce as an ideal measure an antitoxin. The "antithyroidein Moebius," marketed by a well-known German pharmaceutical firm, was one of the first preparations to attract the attention of clinicians. It is a serum derived from thyreoidectomized sheep, and, although it in no sense fulfills the requirements of a specific serum, it nevertheless has proven of some value. The preparation is marketed in small glass vials, containing ten cubic centimeters, its stability ensured by an admixture of 0.5 per cent. carbolic acid solution. The Moebius serum will be found rather expensive ($1.50 per vial) for average use. Its curative effect must certainly be denied, but it is quite likely to afford more temporary relief in a large series of cases than other preparations similar in kind and intended for a like purpose. I have had occasion during the past two years to use this preparation in eight cases, for variable periods, in ascending doses, beginning with five drops and carrying the average dosage to twenty-five drops, by mouth, three times a day, after meals. In three patients I observed a favorable influence on the tachycardia and subjective accessory symptoms, which improvement became more marked as the dose reached and exceeded eighteen drops. In one patient, a girl of nineteen, I noted an appreciable decrease in the goiter, but there was no other favorable reaction to the treatment, even when the serum was pushed to thirty-five drops, three times daily. In another young lady of twenty-four and a man of forty the administration of the serum and the course of bed rest caused a constant rise of temperature from 98.6° to 99.4°, together with an increase in the nervous symptoms calling for its discontinuance. In two cases the results were entirely negative. In all cases the increase in dosage was from five to eight to twenty-five drops, gradually getting back to the starting point. The longest period of administration was six weeks.

The second preparation to arouse the interest of physicians was that elaborated by Rogers and Beebe, who aimed to produce a specific active anti-serum made from human glands for the treatment of thyroidism.

The authors admit the cytologic character of their serum and the undesirable reactions it may cause, which they seem unable to prevent because of the action of a specific serum on the body tissues in general not participating in the perversion of thyroid function. It can not be said that Rogers and Beebe have failed in the fulfillment of their intention to produce a specific serum, but it is to be doubted if in our present state of serologic investigation a specific serum can be made that will not of necessity contain substances so toxic for the body as to be harmful and even dangerous. If a serum could be prepared that would be specific for thyroids and neutralize only the toxins of hyperthyroidism without in any way influencing other metabolic processes, then, indeed, would we have arrived at an ideal solution of the serotherapeutic problem of this disease.

In their study of the large number of cases in which this specific serum has been applied the authors have sought to classify their cases according to (1) those favorable for treatment; (2) those atypical forms in which a combined treatment would be indicated. They assert that the types favorable for the treatment are:

1. Typical Graves in the early stages; that is, incipient, mild, severe and extremely severe forms—the acute toxemic malignant types.

2. Typical Graves, subacute with occasional exacerbations, but without marked secondary changes.

3. Types that may require treatment—that is, cases that develop thyroidism after forty or fifty, those past middle life who show thyroidism for a varying period before appearance of a goiter, those with long-standing innocuous goiter for years and late in life developing signs of thyroidism.

In view of the very extensive inquiry that Rogers and Beebe have made I think it less relevant to go into detail than state briefly their net results. Of 246 cases reported by them 227 were of the class favorable for treatment. They say that 30 per cent. of all cases under careful management can be practically cured, and the earlier they come under treatment the better the prognosis. Fifty per cent., they assert, can be improved. In 20 per cent. they have failed, and of these 10 per cent. have already died.

It should be remembered that the technic of administering the serum, which is by way of subcutaneous injection, is attended with local, and in many instances general, systemic reaction, sometimes of alarming, but not serious, nature.

*Organotherapy.*—The theory of hyperthyroidism a number of years ago—in fact, at its inception—created a vogue for organotherapy in this disease, which was neither well founded in principle nor proved in fact. Thyroid preparations were recommended and held in high favor. Even now they are not as of right they should be—obsolete.

In consonance with the thyreogenic theory that hypersecretion occurs, the administration of thyroid extract would appear to be illogical and contraindicated, and on the assumption of a perversion of glandular secretion would rest only a very relative indication for its use. Iodo-

thyrin, too, after a fair trial, has been found wanting. Thyroid extract, given in modest dosage, has, I think, in an overwhelming number of cases so aggravated the symptoms as to warrant its disuse. As for thyroidectin, at one time so popular in this country, it can not be said to have ever stood approved, although now and again, following its administration, a "brilliant result" was faithfully reported. Other glandular preparations advocated, such as thymus extract, ovarin, "probylin" (Roche), have proven uniformly disappointing. Not a few organotherapeutic specialties have from time to time been made marketable, such as rhodagen and Basedowsan, while Lantz has encouraged the use of milk from thyreoidectomized goats, but these are all therapeutic refinements of very doubtful value.

*Electricity.*—The actual value of electrotherapy in this condition has never been determined, and even its relative utility may be said to have decided limitations. The galvanic current has been recommended with instructions to place one pole (anode) over the sternum, and the other (cathode) at the angle of the jaw, allowing a mild, uninterrupted current to pass for about five minutes at each treatment. I have in one or two instances been able to verify what others have occasionally observed following this sort of mild stimulation—namely, a slight reduction in the goitrous enlargement—but it was an effect too insignificant and temporary to prejudice me in favor of its use. In line with these attempts to reduce the goiter have been the efforts directed at mechanical compression by a large collodion patch or bandage placed over the gland, both of which measures are wholly valueless.

*Symptomatic Measures.*—The selective treatment of one or more of the aggravating symptoms in this disease is seldom contemplated until general hygienic measures and a thorough trial of complete rest have been instituted and found ineffectual. A long list of remedies might contain a few that could be considered of avail, but not necessarily of much service. I wish to recommend, however, the administration in small doses, 10 to 30 grains, of sodium phosphate, dissolved in a one-third or one-half tumbler of warm water, and given three times a day after meals. It is particularly helpful early in the treatment, and especially so when the rest régime is in force. Its action as an eliminant may materially influence a reduction of the toxemia, hence its good effect. Where diarrhea is already present to a troublesome degree and the sodium phosphate has a tendency to increase it I have found that Bramwell's substitution of potassium phosphate in the same dosage acts well.

The good results which Babinski several years ago attributed to the use of sodium salicylate, gr. xv, given three or four times daily, I am not in a position to confirm. The feeling of nervousness which overwhelms so many of these patients and is frequently exhibited by nervous starts, shocks, apprehensions and vague fears is to be met with sedatives. The bromids in adequate doses of from 20 to 60 grains, two or three times daily, may be found necessary to overcome these distressing symptoms, and in the very aggravated cases it may be well to use chloral

hydrate. When a tumultuous and rapid heart action continues to annoy the patient small doses of bromid for a continuous period of time, together with rest and the ice-bag, may suffice quite as well and do even better than the heart tonics, digitalis, strophanthus or spartein sulphate, which usually fail to control tachycardia and precordial distress. Gowers advocates the use of belladonna (until the mouth is dry and the pupils widely dilated) to allay the cardiovascular throbbing of which quite a few patients are conscious.

Forcheimer's strong prejudice in favor of the hydrobromate of quinin treatment in these cases has led to its frequent use by other observers. I have been impressed with the statements of so careful a clinician as Forcheimer, but have had little or no experience with the drug, which is administered in gelatin-coated pills containing quinin hydrobromate, gr. v, and ergotin, gr. i, and given four times daily for a long period of time.

In summing up: Called upon to treat a case of incipient Graves' disease, immediate bed rest should be encouraged, with a view to early operative interference. In advising the latter I should specify and insist, if I dared, that only a surgeon competent and experienced in thyroid surgery be called upon to perform the operation. In the light of cumulative surgical statistics, I believe that to temporize and tide patients over from one acute exacerbation of thyroidism to another, and so on, for several periods before advising operation means subjecting them needlessly to constantly increasing toxemia, diminished resistance, goiter heart, etc., eventually bringing them into the realms of high mortality.

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## A PRELIMINARY REPORT UPON THE ADVISABILITY OF THYROIDECTOMY IN CATATONIC DEMENTIA PRÆCOX.

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IN ASSOCIATION WITH
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**Before beginning a discussion of this subject, we wish to emphasize that the present contribution is but a preliminary report upon which we feel an ultimate decision can not be based. It is but a report of work in progress. We wish to be neither ultra-conservative nor over-enthusiastic, but desire to maintain a strictly scientific attitude of investigation, and wish not to be betrayed into either advising or condemning the procedure.**

The trend of scientific thought toward a more exact knowledge of the processes of metabolism has brought forcibly to our attention the relation of the ductless glands to disease. The brilliant results of surgery in exophthalmic goiter and the progress of our knowledge in relation to tetany and myxedema are thought by some to be but the first step into this unknown realm of physiology.

It has long been thought that certain mental disorders might have some relation to the perverted secretion of these glands. Laignel-Lavastine in an address on psychiatry at the recent congress held at Dijon[1] summarized our knowledge upon this subject and submitted certain questions to the congress for discussion. The consensus of opinion of the congress was that some relationship *probably* existed between disturbances of these organs and certain psychic disorders; and, secondly, that, taking into consideration cerebral predisposition, we may admit the *possibility* of a glandular origin of certain cases of cerebral weakness, dementia præcox, partial delirium, functional nervous disorders, hysteria, neurasthenia and psychasthenia.

Berkley, following the same line of thought, has arrived at the conclusion that there is a causal relationship between dementia præcox and the thyroid gland. He bases his assumption upon the following:

1. He has demonstrated that desiccated thyroid gland and iodin, which is now known to be an essential element in thyroid metabolism, aggravate the symptoms.

2. The disease often arises at puberty, when the ovaries and thyroid, in common with other organs, take on a change of function.

3. There is a real or chance similarity between certain symptoms of this disease and exophthalmic goiter. For instance, the increased reflexes, the heightened mechanical muscular irritability, hyperidrosis, tremor, skin changes, profound loss of weight, rapid pulse, and dermographia. At times, the thyroid gland is markedly enlarged, and very frequently there is a fullness in the neck.

Acting on this assumption Berkley and Follis operated upon eight cases and reported their results in the *American Journal of Insanity* of January, 1909. At the time of operation three patients had been insane for periods varying from four to twenty months. They were all mute and catatonic; five out of the eight recovered completely and remained well for from two to eight months when they were last seen. One of the remaining three was somewhat improved and two showed apparently no result. These last three were all insane over thirteen months when operated upon.

Case 4 was much improved after the operation, but at the end of the second month the remaining half of the thyroid hypertrophied with a return of the symptoms and was removed when the patient recovered and has remained well ever since.

While catatonic dementia præcox is frequently subject to remissions, such immediate and lasting results were beyond the bounds of mere coincidence. Still it seems to us we should be most guarded in our deductions. The cases were too few. They were all early cases where it is always difficult to be sure we are dealing with true catatonic dementia præcox. They might have been temporarily better following the shock of operation. However, this much safely may be said—that it is at least wise to investigate the question further. These investigations should, however, be made in a field where there can not be any possible room

1. Journal de Neurologie, 13 annee, pp. 316-36 and 333-73.

for doubt as to the diagnosis. Here the pathological changes in the gland would be well established and would give us some basis from which to work in the future, although secondary changes in the system might preclude the possibility of recovery from the disease.

This, then, was our purpose in taking up the work, to find out whether or not there was a pathological condition in the gland which would establish the relationship of dementia præcox to the thyroid. Incidentally a study of the clinical course of the cases might throw some light on the question.

Owing to the secondary changes throughout the system little hope was entertained for alleviation of the symptoms in these old cases, although one of Berkley's cases that recovered had had the disease twenty months. After the pathological condition in well developed cases was known and the clinical course studied it was felt that we would have some solid ground from which we could advance into the study of the indefinite and early cases and thus settle once and for all whether or not anything might be expected from the procedure. We present here only the first part of our report, that upon the old cases. We have operated upon only two early cases. One of these was operated upon only the day before yesterday. The other case, with a third not included in this series, shows marked improvement and will be reported by Dr. Pollock. We expect to increase this list of early cases and then give a final report, which we hope will be conclusive.

The work was begun some four months ago, when material was placed at my disposal through the courtesy of Dr. O. C. Willhite of the Cook County Institution for the Insane. The cases were selected and studied carefully by Dr. Louis J. Pollock.

With the assistance of Dr. A. B. Eustace and Dr. Pollock these cases were operated upon and seven-eighths of either the right or left lobe excised without cutting any muscle except the platysma. The operation was extremely simple. The patients all made an immediate and uneventful recovery. The glands were sectioned and studied with the assistance of Prof. F. R. Zeit and Mr. Maynard of Northwestern University Medical School. In three cases parathyroids were removed by choice, since we wished to see if this might have any effect upon the course.

The findings may be grossly classified as follows:

Two were practically normal, two showed excessive parenchymatous growth; one was a marked colloid goiter, while five showed moderate colloid growth. Marked hyperemia was present in all of the glands and microscopic hemorrhage was commonly present. It is readily admitted that the above classification is not a scientific one, since it is now known that frequently one type shades into the other, but we have chosen the predominating characteristic and it makes a clinical division which is readily understood by all.

What is the result of our findings? Owing to the lack of time it is impossible to discuss the record-making contributions of Marine and Williams, Bauman, and Reid Hunt upon thyroid metabolism. It should be mentioned, however, that the former have shown that by feeding iodin hyperplastic glands become colloid, and conversely by withdrawing

iodin and removing parts of the colloid glands they become parenchymatous, and these again can be made colloid by feeding iodin. In other words, they have demonstrated experimentally what Wilson maintains occurs in the human—i. e., that colloid goiter may be a secondary stage of an original hyperplasia and excessive secretion. So that, even though in these cases we found only two glands showing a tendency to the picture noted in Graves' disease, the colloid glands found may be a degenerative change and so do not absolutely contraindicate an assumption of a previous perverted or excessive thyroidism. In other words, eight out of ten cases showed pathological changes compatible with the assumption of a thyroid origin for the disease.

The persistence of the symptoms of dementia præcox after the active processes in the gland have ceased may be explained in the same manner as the similar picture in Graves' disease where we remove an apparent colloid gland in a patient showing marked symptoms; i. e., the patient is suffering from lesions of the central nervous system—myocarditis, etc.—which were produced by long passed thyroid toxemia.

Altzheimer and others have shown similar changes in dementia præcox.

So much should be said for the sake of fairness. On the other hand, colloid goiters certainly do develop without evidence at any time of perverted metabolism. Moreover, a study of five of Berkley's cases made by McCallum does not show pathological evidences of Graves' disease and these were early cases. Of the five, two were colloid goiters, two normal and one showed parenchymatous change.

As far as we could determine the parathyroids we removed did not show any characteristic pathologic change.

To sum up the matter, one can not assume any distinct pathological basis for ascribing dementia præcox to a hyperthyroidism similar to Graves' disease. We recognize, of course, that this is only one phase of the question and that the pathological picture can not definitely exclude a perverted thyroid metabolism as a factor. That partial thyroidectomy is absolutely of no avail in old cases I believe it is safe to assume. But when one remembers that Berkley has had five cases apparently completely recover and we have had two greatly improved, if not cured, by this procedure, and nothing else is known which may offer any hope in this group of most pathetic psychoses, it seems justifiable to continue our investigations in the early cases.

### REPORT OF PROGRESS OF CASES BY LOUIS J. POLLOCK, M.D.

The following is a brief report of the clinical course of those cases of dementia præcox operated upon by Dr. Kanavel. Before reporting upon them, however, it will be well to mention the outcome of a case of dementia præcox, incidently operated upon for the relief of dyspnea, etc., due to pressure from a thyroid tumor.

The patient was a male, age 22, family and personal history practically negative. He was always well until he was 20, when he became peculiar and exhibited signs of early dementia præcox. At the same time it was noticed that his neck began to enlarge; he became delu-

sional, he saw spirits, was noisy and maniacal. He was taken to the Detention Hospital. He was received at Dunning March 13, 1907, where the excitement was replaced by a condition of apathy, refusal to speak, emotional indifference, which, with periods of hallucinations, were the predominating symptoms of his condition. During the course of his disease there occurred febrile attacks, associated with swelling of the thyroid, rapid heart action, some leucocytosis and increased excitement and hallucinations.

He was operated upon Aug. 12, 1908; a partial thyroidectomy was performed by Dean Lewis and Dr. Rouen; on the 24th stitches were removed and patient had improved physically. Sept. 9, 1908, showed marked improvement mentally, the hallucinations had disappeared and thought process had become clear; Sept. 16, 1908, he was paroled to his mother; three days later went to work and has not been heard from since.

The series of cases operated upon by Dr. Kanavel consists of ten males and one female; eight of these are purely catatonic dementia præcox, presenting for the most part the symptoms described below and which for avoidance of repetition need not separately be considered in each case, one hebephrenic and two cases presenting a mixed type.

Of the eight catatonic patients but one needs to be dealt with separately. The others present the following picture:

They are dull, apathetic, show marked defect in attention, do not exhibit any interest in their surroundings, remain mute, giving no indication of having heard the question addressed to them, show no manifestation of emotion on stimulation, present great lack of voluntary activity, remaining in the same place and posture for hours; in one there is marked negativism, a senseless resistance to all movements; in another there is more marked cerea-flexibilitus. Accompanying this group of symptoms are also physical signs of dilated pupils, reacting promptly to light, cyanosis of extremities, dermographism, hyperidrosis and increased reflexes. The two mixed types present, in addition to the symptoms of catatonia, the one tendency to fabrication and fleeting delusions of grandeur, the other a silliness and grimacing suggestive of hebephrenia.

The above group of cases may be divided into those in whom the illness has lasted from five to ten years, from two to five years and those under one year. Of those lasting from five to ten years there are three cases—6, 8 and 10 years respectively. Of these two are pure catatonics and one mixed type; of those lasting two to five years there are 6 cases, 2, 2, 2½, 3, 3½ and 4 years respectively; of these 4 catatonics, one mixed and one hebephrenic; of those under one year there are two cases, one but recently operated upon, duration from 6 to 8 months, and one male, age 23, duration 10 months.

In the first group—namely, those from five to ten years—there has been no change in the condition since the operation; in the second group, from two to five years, one catatonic, age 19, during 3 years, presents but the slightest change, such as would occur in the course of the disease—namely, he now answers some of the questions addressed to him while formerly remaining mute. The others in this group present no change in

their condition. Of the third group, one has been too recently operated upon to discuss, the other is a male, age 23, of a catatonic type.

Father died in an insane asylum at the age of 35; previous history negative. Present illness began April 19, 1908, with worry, then development of mutism; would stand in one position for some time; had vague delusions of persecution, and was admitted to the hospital May 7, 1908, in a catatonic state, staring stolidly before him, answering all questions with the phrases, "I don't know; I couldn't say." An examination in January, 1909, showed but little defect in perception, some loss of memory, the presence of delusions of persecution, great emotional deterioration, attention at times very hard to get and interest very little. He showed no voluntary activity, would not help upon the ward and remained mute except when hard pressed. Operated upon Feb. 8, 1909. Feb. 15, 1909: Has evinced the idea to work. February 22: He is up working about the ward, making the beds, taking interest in his surroundings, talking to other patients. March 1: Improvement continues; patient wants to be interviewed to show that he is well, as he wants to go home. March 15: Wrote a letter to physician telling how he felt, an act of volition certainly not present before the operation. May 8: During the past few weeks, owing to the fact that his mother is unable to take care of him at home as yet, shows greater depression, but is still greatly improved.

DISCUSSION ON THE PAPERS OF DRS. PATRICK, HECHT, KANAVEL AND BLACK.

(*Symposium on Exophthalmic Goiter*).

Dr. Frank P. Norbury, Jacksonville:—Mr. Chairman: It was my privilege to hear Dr. Berkley's paper as read before the American Medico-Psychological Association at the Cincinnati meeting last year. I have since followed the literature, meager as it is, and I find that there is nothing definite, nothing we can tie to that changes our attitude toward dementia præcox. I personally believe in the toxic theory in the genesis of dementia præcox. My clinical experience derived from observation of cases from their incipiency, along the years to terminal dementia, has taught me this. Again, Kraeplin's teaching, together with that of others, deserves most careful consideration. Yet, after all is said and done, experience also teaches that there must be a background upon which the fearful picture of dementia præcox is painted. That background is the irrevocable native potentiality which runs its course, spends its energy in the climax of adolescence. Study the symptom complex of dementia præcox appearing as early as thirteen years and as late as thirty to thirty-five (I give these ages from my own clinical cases), and what do you find? Certain ill-defined metabolic disorders, coupled with the development or maturing of sexual factors (which are contributing elements to say the least) in the growth and complexity of the problem. The defences of the organism against disease are vulnerable, more so than usual and the clinical course suggests, confirms, toxic etiology. But I say plus unusual susceptibility. We know nothing of the clinical pathology of the disease, as yet, worth while, to justify the expectancy of Berkley. We all have had cases even in the years when we called such primary dementia, which seemed to have no apparent toxic cause. They were dements by deprivation; they were not capitalized sufficiently at the beginning; hence, their mental and physical capital was spent when adolescence made its run upon the bank.

Again, dementia præcox may be a sequel to a defined metabolic disorder, such as infantilism. I had such a case recently. The patient, male, aged 26, had the mental ensemble of dementia præcox and the physical makeup of infantilism.

He lacked sexual factors to add to the contributing factors in the cause of his troubles. He was a child in this respect. The thyroid was not involved in this case.

Now, what does the future offer for dementia præcox? I wish I could be sanguine, hopeful as regards surgical interference. I am a friend to scientific surgery always, and if it can offer to this unfortunate class, which otherwise must go "to the scrap heap," some hope, all well and good. But I must still believe dementia præcox exists because of hereditary conditions and conditions of deprivation, the study of which can be revealed through Mendenl's law. These cases lack the potential possibilities to carry them through but a short span of intellectual life. Fifty per cent. can be classed under this head. Fully 25 per cent. recovery, sufficiently at least to reach a mental level that is compatible with a fairly useful and happy existence, providing some one can wisely direct them. We all see such cases. I had one, eighteen years ago, who for fifteen years has been successful in business. I could mention perhaps fifty others who are self-sustaining, and all could come under the clinical classification of Kraeplin, be called dementia præcox; most of these belonged to the catatonic group.

D. Hugh T. Patrick (closing the discussion on his part):—I have nothing more to say with reference to the diagnosis, but I do wish to say a few words about treatment. With regard to the non-operative treatment, I should like to say that there are two or three things well worthy of consideration, and one of these is galvanism. I do not know why it should be so and I have no theory on the subject, but I believe that the galvanic current properly applied to the neck, whether that means galvanization of the cervical sympathetic or of the pneumogastric nerves or of the thyroid gland, is certainly of some avail. Then there are some of these cases with great nervous erethism that seeem to do better on bromids than anything else. Why that should be I do not know in the least.

As regards the surgical treatment, I am quite in accord with what Dr. Black has said. The recent statistics of surgical treatment are remarkable as compared with the early efforts in this direction. But then, as a matter of daily practice, may we not allow ourselves to be guided by the statistics of men like Kocher, who reports three thousand cases of operations on the thyroid and several hundred cases of operations for Graves' disease? Such statistics are not to be considered thoughtlessly, but with the understanding that a man who has operated upon three thousand cases of goiter and two hundred and fifty cases of exophthalmic goiter would naturally be expected to have statistics very much better and more favorable than the ordinary surgeon of wide experience, who has operated upon perhaps twenty-five cases of exophthalmic goiter and one hundred cases of goiter. It is not altogether fair to the patient for us to conclude that because Kocher loses one in twenty-five cases of exophthalmic goiter, therefore the surgeons of our acquaintance to whom we must refer our cases are going to operate on the basis of a like percentage. Not in the least. Let us take the first sixteen cases operated on by Dr. Charles Mayo, in which the mortality was 25 per cent. A surgeon who operates nowadays has the advantage of the experience of Mayo and Kocher. He can read what these men have written and profit by their experience, to a certain extent. But we must remember that when Dr. Mayo operated on that group of cases, in which the mortality was 25 per cent., he was already an unusually skilful and experienced surgeon. He was not a tyro. So that it is not fair to the patient for us, in recommending the operation, to say that it can be done with the chance of losing one patient in twenty-five. We must not forget that these patients often undergo an operation which apparently is surgically perfect and yet they go into collapse and die. Whether it is due to an expression of the secretion from the gland or to shock of a peculiarly susceptible nervous system, or to one or other of sundry causes assigned, we do not know. But these deaths do occur in the best and most skilful hands.

To summarize, I should say: Given a patient with Graves' disease who is reasonably well under rest, bromid, baths, electricity, salicylate of soda, etc., who can go about and attend to her duties with a fair degree of comfort, who gets a considerable amount of sleep, who is not very weak, she had better be

left alone. On the other hand, if a patient is not comfortable, is distressed, is sick, she would better be operated upon, provided the patient is not so sick that the chances of operation would be very serious. A surgeon said to me that he would not operate on a person with Graves' disease who could not walk around the block. Certainly not. I would not advise that a patient be operated on for this disease who could not walk three or four times around the block. A patient who has not the vitality to take a fairly vigorous walk is in no condition to undergo this really serious and hazardous operation.

Dr. Kanavel (closing the discussion on his part):—I have only a word or two to add in closing the discussion. Had there been sufficient time at my disposal, I would have taken up the subject of serumtherapy and the pathology of Graves' disease and dementia præcox.

In regard to operating on cases of Graves' disease, there is one thing I would like to mention, and that is, in cases of toxemia following operation, and in the event of toxemia before operation, in my experience, particularly after operation, the use of a large amount of water given subcutaneously, with the idea of flushing out the system and removing the toxic material, acts most remarkably. I have had cases after operation which seemed to be in collapse, but after having given them large amounts of water subcutaneously they have reacted favorably.

Dr. D'Orsay Hecht (closing the discussion on his part):—I should like to be counted among thosa who subscribe to the spirit of the work exploited by Berkley in his first report. This work is in line with the ambitious type of research that is being carried on at the present time in behàlf of a better understanding of what we are pleased to call the internal secretions, the ductless gland, in which particular sphere may be included the problems that relate to the hypophysis, the tryroid, parathyroids and thymus.

I think Dr. Kanavel is not only to be congratulated on his report but upon the conservative attitude he takes; the fact that he is not carried away by the operative possibilities but pays full respect to the clinical picture of a mental disease with its unfavorable prognosis calls for quite as much approval as his surgical report. The field is an enormous one, and whether or not anything is to come of it, as Dr. Norbury has emphasized, remains to be seen. We should be more than willing to embrace the surgical aspect of dementia præcox if the results are convincing, much as we find ourselves welcoming the operative treatment of Graves' disease.

As to the question of infantilism in connection with dementia præcox, as referred to by Dr. Norbury, it is in accord with the pathologic possibilities of the ductless glands and ductless gland secretion, as, for instance, witness the feminism and reversion to infantilism in cases of hypophyseal tumor. Here we meet with it as an evidence either of hypo- or hypersecretion. It is not at all inconsistent to think that low ancestral vitality, bad heredity, etc., may tend to develop a constitution deficient in the secretions that are necessary for the full normal potentiality that Dr. Norbury has referred to.

The prognosis in patients suffering from the catatonic type of dementia præcox, would seem to be the least favorable of all the clinical forms, and yet they are regarded as more hopeful than the paranoid or hebephrenic type of cases.

I have but little to add. I think Dr. Patrick's attitude is an ultraconservative one. I recently saw a case of Basedow's disease in which I advocated rest treatment for a period of three months, and specified how it should be carried out, anticipating operation; furthermore, I requested that the operation be done by a man amply qualified to do thyroid surgery. In giving such specific advice some of the drawbacks apprehended by Dr. Patrick are entirely eliminated. Ultraconservatism fails to take into account the very important factor in these cases of toxemia. When it comes to the question of operating on these patients, the element of already present or impending toxemia must be considered. It occurs to me they would stand a much poorer chance of recovery if operated on later than early, in their very incipiency. I reiterate that if I were confronted with a case of in-

cipient Basedow's disease I would prepare the patient in every detail consistent with a desire to reduce the toxemia, and when that had been reduced to its lowest degree and such secondary changes, as are referable chiefly to the heart, afforded little or no concern, I should feel that the favorable time had come to consider operation, and there would be no hesitancy in placing the patient in the hands of a thoroughly well qualified, competent surgeon, one who had done enough thyroid surgery to justify the choice.

The 5 per cent. mortality mentioned applies not only to Kocher, but to Schultz, Reidel, and others, who are doing the most approved kind of goiter surgery; this percentage is at no disadvantage in comparison with the percentage of inevitable deaths which not infrequently occur very early in the disease and commonly in the course of eight or ten years.

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## TUBERCULOSIS IN INFANTS AND CHILDREN.*

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Tuberculosis in infants and children is a disease to which more attention should be directed, not alone because of its frequency, but because of the extreme importance of an early diagnosis, and the possible further fact that deaths are often ascribed to other diseases when tuberculosis is a most important factor in the etiology of the illness.

The frequency of death from tuberculosis is greater than any statistics would show, many doctors being very slow to recognize that disease in the very young, and, as many children die of diseases presenting obscure symptoms, it is not improbable that many deaths are honestly attributed to other diseases which have nothing more to do with the death than to add a complication.

There is a strong disposition on the part of the laity, and also to be observed in the profession, to assign as a cause of death the disease which leaves the impression of ready belief, and in the face of the popular opinion that consumption is not a disease of childhood it appears comparatively infrequently in the death certificates.

In the United States census returns for 1900 we find there were 2,106 deaths of children under one year ascribed to tuberculosis and 4,754 deaths of children under five years attributed to the same cause. Now it will be fair to assume that many deaths reported due to other causes were in reality tubercular. The presumption is made stronger by an analysis of certain classes of causes in which many of the conditions and symptoms found in the tubercular are usually present. Of these mention may be made of "malarial fever," "enteritis," "debility and atrophy," "meningitis," "convulsions," "pneumonia," "bronchitis," "peritonitis," and various diseases of the "bones and joints."

When we take into account the fact that it is only in recent years that the extreme prevalence of tuberculosis was recognized in adults, and that to many it is still unrecognized sufficiently early to render any treatment of benefit, it is not surprising that with a diagnosis based wholly upon objective signs the true nature of the disease might escape

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the ordinary superficial scrutiny so frequently observed in the clinic room.

Among the causes for the frequency of tuberculosis in infants and children heredity may be mentioned; and, though the direct transmission of the infection from mother to child through the placenta may be rare, we must still admit the inheritance of the type of the parent, and with this the susceptibility to certain forms of disease. The milk from tuberculous mothers, or from tuberculous cows, can be charged with a fairly large percentage of the tuberculosis in the very young. On this subject Osler's *Modern Medicine* presents, in the chapter on "Tuberculosis: History and Etiology," by Edward R. Baldwin, M.D., the following plain statement, which should be kept constantly in mind by the physician who is called to treat diseases of children: "The resistance to tuberculosis is least in childhood, when the tissues readily permit the infection to enter at various places and to be more easily distributed." If this be accepted as a truth we may be guarded in making a diagnosis without giving due weight to the possibility, or even the probability, of tuberculosis in any obscure case being the cause of the derangement.

While carelessness in examination may be occasionally charged against the doctor, and he be held responsible for errors in diagnosis, it is still oftener that the ignorance of parents is responsible for the advanced "home-made" diagnosis and treatment so common with many parents. Another fault, which is found to prevail to a great extent in cities as well as in the country, is the suggestion of various remedies by the friends, relatives, and even casual acquaintances of the family of the sick child. It is very easy for one person to offer a course of treatment for another if both are equally ignorant; and it is not unusual to find that the suggestions have been adopted, and often to the detriment of the little patient.

While we may not be able to fix with certainty the relation of intestinal infection to infection by other routes, there are still sufficient data to establish the fact of such mode of invasion and sufficient evidence of its frequency. On this point we may quote from recent reports which show a varying percentage, but so positive that doubts can no longer be entertained that a large number of children become tubercular through the digestive tract. Cases of primary intestinal tuberculosis, as determined by autopsies, have been reported as comprising 19 per cent. in Halle; Lubarsch found 21.2 per cent. in 297 cases; in one hospital in Berlin 16 per cent. of the autopsies in infants and children were primary tuberculosis of the digestive tract; one series of autopsies showed the astonishing rate of 47.6 per cent. In England reports of 1,560 autopsies give 18.6 per cent. of primary intestinal tuberculosis. In Copenhagen it is estimated that 10 per cent. of all cases of tuberculosis are of this variety, though Harbitz found 22 per cent. of 117 cases to be of this form. The above figures are quoted from a recent paper by Ravenal, professor of bacteriology in the University of Wisconsin, and published in the April issue of the *Cleveland Medical Journal*.

A study of these facts is the more necessary because of the statements by Koch as to the impossibility of acquiring tuberculosis from the milk of tuberculous cows, the bovine bacillus not being identical with the bacillus of human tuberculosis; statements which, if they do contain even the slightest degree of error, are calculated to do very great harm by the wide dissemination of anything coming from so eminent a man and by the great weight attributed to his mere opinion.

The question of whether bovine and human tuberculosis is identical is not so much the question as whether either the one or the other can cause death, and on this question there is now almost an unanimity of opinion. Both are deadly, and both forms should be guarded against in the young and growing child because of its special susceptibility to this form of infection. It is probable that more than 10 per cent. of all deaths from tuberculosis in infants and children are due to the bovine bacillus.

These facts lead to the inevitable conclusion that tuberculosis might be reasonably expected to furnish a large percentage of the deaths of infants and children, and should demand from us a most careful scrutiny of every case of doubtful character, and when we are unable to fix with reasonable certainty upon a cause other than tuberculosis, at least bear in mind the strong probability of this being the cause.

It is not long since I have heard a physician say that he had never seen a case of tuberculosis in "right young children," but he had seen a "number of cases of chronic malaria and some of them had been fatal." Now, while I am not disposed to doubt the diagnostic skill of the gentleman, I am still of the opinion that his judgment has been too hasty in at least some of the cases, and a part of them had tuberculosis instead of "chronic malaria."

As it is not my purpose in this paper to do more than to point out some possible errors and suggest a reasonable caution in dealing with infants and children, I will not enter into the subject of diagnosis and treatment, either being too large for a paper for this society, but for the purpose of emphasizing certain features of my subject I will report a case of so much interest to me that I feel like dividing it with my colleagues. One reason for the high degree of interest in this particular case is the fact that the father of the child is a dairyman and supplies milk to a number of the inhabitants of the city of East St. Louis, and from this circumstance, and the further fact that the inspection of the cows in the dairies is not systematic, we might readily believe that other cases of a similar character occurring in the families taking milk from this dairy become infected through that medium. How many such cases have been seen during the time this particular dairy has been in existence it would be impossible to give an estimate. It may be readily believed that the same results will follow from the same cause which doubtless exists in other dairies in our city as well as elsewhere, and that many of the obscure cases of disease in infants and children should be attributed to primary "intestinal infection."

The case I have to report is as follows:

On Jan. 9, 1909, I was called to see a child, twenty-three months of age, and found the following history: About July the baby had been ill

with "malaria," according to the "home-made" diagnosis, principally under the experienced grandfather, whose profession is that of the law, and for this "chill tonic" had been given for several weeks, with no apparent good results, though during the treatment for "malaria" there had intervened a severe diarrhea, or "summer complaint," as stated in the history, and for this a great variety of so-called "home remedies" had been administered, beginning with the very popular "Jamaica ginger," followed by "blackberry brandy," "castor oil," and "calomel," the latter being repeated at frequent intervals during the summer, even after the diarrhea had subsided. From all this treatment there was no gain in weight, but rather a constant loss.

It is proper to state that, after the failure of the "chill tonic" to restore the child to health, the diagnosis had been modified, and the treatment changed according to the amendments in the diagnosis; this included "stomach trouble," there being some vomiting at times, and for which lime water was administered in the food, which at this time consisted principally of milk, and, it is needless to say, from the cows in the "home dairy." As this line of treatment gave no apparent relief, made no improvement in the general condition of the child, which still continued to decline, a diagnosis of "liver trouble" was made, and here is where the calomel became of such great importance, and where the popular idea that calomel is the remedy for all forms of disease of the liver was given its full share of credence; but the results again showed that another fault had been made in diagnosis.

Matters remained about the same with this poor child until I was called on January 9, as stated, though, in addition to the conditions already mentioned, it had fallen from a "high chair" a few weeks before, though it had not appeared to suffer from this fall at the time. The grandfather insisted that this was the cause of the continued bad condition under the persistent treatment it was getting. A few weeks prior to my visit another factor of extreme importance was added: An older brother had thrown a shoe at the "baby" and had struck it a blow on the forehead, and, although this left no marks, it became a potent "cause" in the complicated case.

When I first saw it the child had but little fever, but showed that it was badly nourished—was sallow, skin dry and harsh, eyes dull and apparently weak. It had been vomiting and it was thought that convulsions were threatening, though there had not yet been any marked indications pointing to such results; but there had been sufficient symptoms to alarm the parents. At this time I was unable to make a positive diagnosis, but, as there were slight indications of some cerebral disturbance, I ordered sodium bromid in one grain doses every three hours, with two minims tincture of belladonna in elixir and syrup of tolu.

I saw the child no more until the twenty-first of the month, when the cerebral symptoms had become very marked, and there was vomiting and diarrhea, both of which yielded readily to treatment.

The mother was confined on the 23d, and on the 24th I was asked to see the child again, and at this time I informed the father that the baby was suffering from tubercular meningitis and that I did not consider the case at all a hopeful one.

This statement was not satisfactory to the father and after I had gone he called another physician and asked him to undertake the treat-

ment, but, as he was not given all the information possessed by the parents, he did little more than to relieve the worst symptoms and never made a diagnosis.

Three days later the mother called me to see her on account of a severe pain in her back and, after ascertaining that this had no apparent relation to her confinement, being probably due to a neuralgic state, I was asked to examine the baby and to see if anything further could be done for it. The examination gave me no further information, though I did not do more than listen to the heart and lung sounds, and advised that the treatment adopted by the attending physician be continued.

A few hours later I was called again and asked to undertake the further care of the sick child. On arriving at the house I found that the doctor who had been treating the case was already there, and together we made a very thorough examination and informed the parents that there was nothing more to be done than to allay the symptoms of unrest; that the child could not be expected to recover. A sedative consisting of sodium bromid, tincture of belladonna, and tincture of gelsemium was prescribed and we left the house after warning the parents that convulsions would probably come on during the night and that the medicine was for their prevention.

Very soon after I had reached my office I was called and urged to "come at once," as the baby was very "bad," but, as I had patients waiting in the office, I asked that the other doctor be called, and later learned that he could not be reached, but that a third physician had been called in. He also stated that nothing could be done and advised that the course of treatment agreed upon by myself and the consultant be continued. This was done, but the child died during the night.

On the following day the father and grandfather called upon me and asked if I would make a postmortem to ascertain the exact cause of the death. This I readily consented to do, and accordingly made the examination in the presence of the father, the grandfather and three physicians whom I had invited to be present.

On opening the cranium it was found that there was no evidence of any injury to the skull, either by the fall from the chair or by the blow by the shoe, and the skeptical grandparent was shown that his position was not well taken. It was shown, however, that the dura was studded all over with small tumors, few of them being larger than a millet seed, and to this condition was ascribed the cerebral symptoms manifested during life.

The mesentery was the seat of the most active tubercular processes, the glands being in all stages of growth and decomposition, though none had actually broken through the peritoneum even when the parenchyma had been entirely destroyed. Some of them were very large and were apparently actively growing.

The examination convinced every one that the child had died from tubercular meningitis, or that a tubercular meningitis had intervened in a case of tabes mesenterica.

While there is but little which is unusual in the case reported, and probably nothing in this paper not perfectly familiar to every physician, I still feel that I am justified in presenting it, the extreme importance of an early diagnosis demanding the closest attention to all ailments of

infants and children because of the rapidity with which disease advances in the very young.

The facts presented lead to certain conclusions:

1. That doctors can not be too careful in their examination of children; and that, as tuberculosis is the most "common of all diseases," it should be suspected when a positive diagnosis of some other disease can not be made.

2. That parents should be taught that it is dangerous to undertake the treatment of a child for even the simplest forms of disease; that if the child is not seriously ill it will recover without medicine, but that if it is seriously ill it will need the services of a physician; that the parent is not competent to say that the disease is not grave, but that for any deviation from the normal a physician should be called; that if the child is not ill the doctor will know it, and if it is a sick child the case is taken at the earliest possible moment.

3. That the civil authorities in cities should see to it that the milk supply of its inhabitants is of the best quality, and especially that the dairies from which the supply is taken have no tubercular cows.

There are a few other points of importance relating to this subject to which I will call attention but which may appear to be irrelevant: A more thorough system of caring for the tubercular poor should be established in cities, towns, and counties; cases of tuberculosis should be reported to health boards, and, after deaths from tuberculosis or after removals of the tubercular from one house to another, thorough fumigation should be practiced.

DISCUSSION ON PAPER OF DR. LILLIE.

Dr. H. B. Hemenway, of Evanston:—The author speaks of the importance of cities having supervision of the milk supply. After studying the subject for some considerable time, I think this should be by the state. The state is the proper authority. One village or one city will have one set of rules, and another will have another code. The people in general do not appreciate the necessity of having careful supervision of the milk supply. The milk companies will ship milk at one time from one section to a certain city, and at another time from another community, without any previous warning, and it makes it exceedingly difficult for a city like Chicago or Evanston, for instance, to keep up an exact supervision. If the cities supervise their tributary dairy districts, they must travel far from home, often duplicating work and expense as well, and work without authority in the dairy territory. They work at a great disadvantage. I believe this supervision should be exercised by the state.

In the second place, I would call attention to the importance in every case, like that just reported, of having an accurate, careful, bacteriological examination and investigation made, not to depend upon the diagnosis that is made post-mortem, and upon the gross appearances, not only to find out whether or not there is the bacillus of tuberculosis present, but *whether it is of the human or bovine type.* Some time ago, near Aberdeen, Scotland, there were three children in a family, as I remember the report, one of whom died of meningitis. No post-mortem examination was made. Shortly after that a second child was taken sick and died of meningitis, and an examination showed that the meningeal fluid contained the bacillus of tuberculosis of the bovine type. It was found that the family had one cow from which they got their milk. It was found that the milk contained tubercle bacilli, and on the death of the cow they made a thorough examination of the various organs and throughout they found the same type of tubercle bacillus which they found in this case of meningitis.

Again, Hess, of New York, reported the results of examinations made by the injection of milk into guinea-pigs. The tests of can milk taken from the open market, showed that 18 per cent. contained the bacillus of tuberculosis, demonstrated by the injection of the milk and injection of the cream into guinea-pigs, and examining the results. He found the places from which this infected milk was obtained, and got a history of children who were drinking the milk; he found the children who had been drinking the milk, tested them with tuberculin, and found that 25 per cent. of them reacted to the Calmette test. This shows that there is danger of infection to the human being, especially children, from infected milk.

One other point: I think it was Pottenger, of California, who, in an article published not very long ago, called attention to this point, that just as a human being is sensitive to smallpox, and cattle are not specially sensitive to it, but cattle are sensitive to the vaccine disease and the human being more mildly: so in the same way we find the human being is very sensitive to the action of the human tubercle bacillus, but less sensitive to the bovine type. On the other hand, the milder disease protects against the more severe, and so it has seemed to me very probable that in a large percentage of our cases of tuberculosis occurring in young children this disease is overlooked; the child is able to resist the infection, and finally acquires an immunity against the disease.

Dr. H. I. McNeill, of Chicago:—In regard to the prophylaxis of tuberculosis in children, my attention was very emphatically called to the fact that nursing children with tuberculous mothers may contract the disease in that way, where apparently there is not a family susceptibility. This was brought to my attention by a child upon whom I operated on the 24th of December, 1901, at the Cook County Hospital, Chicago. The patient was a boy, nine years of age, who had fallen upon a sharp iron which penetrated the abdomen, and at the operation the mesenteric glands were found very generally tuberculous. One of the glands was removed at the time for the purpose of examination, and found to be tuberculous. This child was the youngest of a family of several children; the other children were all strong; but the history was that the mother contracted tuberculosis while this child was nursing, and the child had undoubtedly obtained its tuberculosis from the mother's milk.

Dr. Lillie (closing the discussion): I have very little to add to what I have already said in my paper. I wish to say, however, that a bacteriological examination was made to ascertain whether or not the mesenteric glands were tuberculous. They were found tuberculous, but there was no differentiation made between bovine and human tubercle bacilli. It was not known what particular form it was, and while this question possibly may for a long time remain unsettled, as to whether or not there is more than one kind of bacillus, in spite of the fact that there appears to be two kinds, it may ultimately be shown that there is but one form of bacillus of different strains, starting possibly from the same origin, but deviating on account of inhabiting different culture media. The time may come when it will be shown that one will merge into the other. No matter what the form of bacillus may be, if we become infected by it, we may die, and especially children, and they should be protected from any possible infection.

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## A BRIEF REPORT OF CASES OF EARLY PULMONARY TUBERCULOSIS TREATED BY DIFFERENT TUBERCULINS.*

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It is not the purport of this paper to over-estimate the therapeutic value of any one particular form of tuberculin, but to compare a group of cases in which different kinds of tuberculin have been used, or none

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at all, and then to analyze the evidence by comparison as to the end results.

The view most generally and justifiably entertained is that human tuberculosis may be, and is, caused by bacilli of either the bovine or human type, supported as it is by the balance of all available evidence.

The British Royal Commission appointed to inquire into the relations of human and animal tuberculosis proved conclusively that the introduction of the human tuberculous material into cattle gave rise at once to acute tuberculosis, with the development of widespread disease in various organs of the body, such as the lungs, spleen, liver, lymphatic glands, etc. In some instances the disease was of remarkable severity, in others mild and localized at the spot where it was introduced, yet tuberculous material taken from the cattle thus mildly affected and introduced successively into other bovine animals gave rise to general tuberculosis of an intense character.

In comparing carefully the disease thus set up in the bovine animal by material of human origin with that set up in the bovine animal by material of bovine origin it has been found that the one, both in its broad, general features and in its finer histological details, is identical with the other.

If, then, tubercle of human origin can give rise in the bovine animal to a form of tuberculosis identical with ordinary bovine tuberculosis, one can safely assume, with Ravenal, "that theoretically there is no reason why the bovine bacillus should not readily be transmitted to man. It has for all other mammalia on which it has been tried a virulence greatly exceeding that of the human tubercle bacillus. It would certainly seem a remarkable anomaly for man, who is one of the most susceptible of animals to tuberculosis, to be immune to the most powerful virus known."

The obvious impossibility of direct experimentation on human beings is unintentionally and indirectly carried out the world over. The milk and butter consumed in great cities often contains large quantities of the bacilli of bovine tuberculosis in a living virulent form, and, while the human and bovine bacilli differ in their morphology and perhaps in pathogenic effect—i. e., different types of parasites—I am sure that bovine bacilli are transmissible to human and are responsible for the greater share of the tuberculosis which occurs in children. I am also convinced that man is attacked by two distinct forms of tubercle, one transmitted by infection from person to person, the other by receiving into the body bovine bacilli from infected food. In other words, the human body is susceptible to both forms of tubercle.

Tubercle bacilli of the typus bovinus appear chiefly in tuberculous lesions of children, the bovine germ usually being found in the mesenteric glands, tuberculous peritonitis, tuberculosis of the lymphatic glands and tuberculous joints. One writer, in summing up his views on the distribution of tubercle in the human body, states that, speaking provisionally and without any final evidence of proof, that tubercle bacilli of the typus humanus produce phthisis pulmonalis and tuberculous laryngitis. Acute miliary tuberculosis he believes to be of bovine origin.

The sputum of adults suffering from pulmonary phthisis was examined, in which only bacillus of the typus humanus were found.

The conversion of the typus bovinus into typus humanus during the lifetime of a single person and in his tissues is unproved, and we are justified, in view of the balance of evidence, in concluding, first, that both types are competent to produce tuberculosis in the human being; second, both forms of the disease have been identified in man; third, the bovine type is more common in children than in adults; fourth, the bovine type retains its special character even in the human subject; fifth, tuberculosis of bovine origin is much less frequent in the human subject than tuberculosis of human origin.

If in the human body two varieties of tubercle can be present at the same time and which, generally speaking, are antagonistic to each other, I have been much impressed with the idea of using a tuberculin prepared from a pure culture from bovine sources for the treatment of incipient phthisis pulmonalis. This tuberculin was prepared from a typical culture of "perlsucht," and is very carefully sterilized and standardized. In contradistinction to the bovine tuberculin, cases of surgical or bovine tuberculosis are oftentimes markedly improved or permanently benefited by the use of tuberculin from human sources. Discharging sinuses, tuberculous glands and tuberculous joints have in this agent a potent means for cure, in conjunction with those agents which improve the general nutrition.

We have administered Koch's B. E. in 104 cases of pulmonary tuberculosis up to the present time. These were classified, incipient, moderately advanced and advanced. This tuberculin was administered only to those who were running an afebrile course or where there was no contraindications to its use.

In the main I am not convinced that the use of Koch's B. E. in the larger proportion of this number was responsible for the results attained. As to the end results in these 104 cases, I shall be pleased to report in a paper at some future time. My purpose in presenting this paper, as stated at the outset, is to compare two groups of cases of practically an equal number and classified as incipient in which different kinds of tuberculin have been used or none at all. One series comprises twenty-three cases in which the bovine tuberculin was administered. The other group comprises seven incipient cases in which Koch's B. E. was administered and sixteen cases in which the tuberculin was not used.

A word as to the method of administration.

In the administration of bovine tuberculin it is best to begin with the minimum dose and slowly and gradually increasing the same until the higher doses are reached. I have never had any perceptible reaction in the administration of this particular form of tuberculin if caution was used in raising the dose. It should not be administered to patients having a persistently rapid pulse or elevation of temperature. Begin with a subcutaneous injection of 0.0001 of a mm., gradually increasing the dose once every week. The second injection, 0.0002 mm., is given after an interval of one week, provided no reaction has followed, and then doses (in milligrammes) in the following order: 0.0004, 0.0005,

0.001, 0.002, 0.0025, 0.003, 0.004, 0.005, 0.0075, and 0.01, the maximum dose, making in all twelve or thirteen injections. If the patient requires further injections the last injection of 0.01 mm. is repeated for a few more doses, but that dose never exceeded. Care must be used in the technic and careful supervision of the patient during the course of twelve or thirteen weeks.

It would be impossible to enter into detail and give the report of all the cases in full. I can only outline in brief some of the more striking ones in this group. I present for your consideration the following cases, treated with the bovine tuberculin in conjunction with sanatorium measures. They were all adults, 11 women and 12 men, and all the cases except two the disease is in the first stage, according to the classification of Turban; that is, involving one lobe of one lung, or both apices limited to above the clavicle and spine of the scapula. In the twenty-three cases tubercle bacilli were found in the sputum.

CASE 1.—A. S., aged 22 years. Occupation cabinet maker. Admitted to sanatorium Dec. 29, 1908. Gave no history of previous illnesses. No tubercular history in family. First symptoms, five months prior to admission. Two or three slight indications of hemoptysis in September. Marked shortness of breath on exertion with cyanosis of finger nails and lips. Coughs excessively in the morning. Some hoarseness. Expectoration thick and yellowish. Numerous tubercle bacilli in sputum. Temperature on admission, 100.4; pulse markedly accelerated; respiration, 22. Laryngeal examination, infiltration interarytenoid space. Slight inflammation of left vocal cord. Chest findings, slight tubercular infiltration right apex. This patient had a very erratic temperature for the first three or four weeks after admission. He was put absolutely at rest. After temperature was reduced gave patient twelve injections of bovine tuberculin. He left the sanatorium after three months, having gained eighteen pounds. Many examinations of the sputum were negative. Cough and expectoration very much improved. Chest examination revealed a healed lesion. Laryngeal infiltration much improved. Hoarseness practically disappeared. Appetite and digestion excellent. On thirty minutes' exercise twice daily. On account of acceleration of pulse and high arterial tension, did not deem it wise to give this patient more than a half hour exercise twice daily. Still some cyanosis of finger nails and lips when patient walked too rapidly. The improvement in this patient's condition was quite marked after the first few injections of bovine tuberculin.

CASE 2.—W. C. H., aged 22 years. Occupation, broker. Examined by Dr. Theo. Sachs and advised to enter sanatorium, which he did on Dec. 14, 1908. Gave history of pleurisy four years ago. Typhoid fever Oct. 12, 1908. No tubercular history in family. First symptoms Oct. 1, 1908. Cough and expectoration. Examination of sputum prior to admission negative. Marked loss of weight. Patient complained of extreme weakness and dyspnea on exertion. Poorly nourished. On admission, temperature, 99.5; pulse, 102; respiration, 24. Laryngeal examination, subacute laryngitis. Chest findings, marked infiltration of apex and middle lobe, right lung. Patient gave a history of a number of attacks of pleuritic pain over right side. Tubercle bacilli were found in sputum after many examinations, and then only a few. This patient's temperature ranged between 101½ and 103 for a period of two weeks. On the 29th of January gave him his first injection of bovine tuberculin, giving altogether twelve injections. He left the sanatorium after four months and a half, having gained 39½ pounds. Many examinations of the sputum negative. No cough or expectoration. Slight dyspnea on exertion. Temperature and pulse normal. Chest findings, still an extensive infiltration upper and middle lobe right lung as indicated by percussion dulness and broncho-vesicular breathing. On one hour and forty minutes' exercise twice daily.

Dr. Sachs saw this patient after discharge and expressed his surprise and gratification at the results.

CASE 3.—Mrs. L. E., housewife, aged 30 years. Entrance Aug. 21, 1908. No tubercular history in family. Miscarriage three months ago, since which time she has been gradually losing in weight. Cough excessive at night with some expectoration. Complains of considerable shortness of breath on exertion, with pain over right lower back. Environment poor. First symptoms three months ago. Examination of chest revealed a slight infiltration at right apex. Prior to admission had had no examination of sputum. Sputum findings on admission were positive. She was given bovine tuberculin—twelve injections. She left the sanatorium after a stay of twelve weeks, having gained seventeen pounds. Still has slight cough, but the amount of sputum markedly decreased. Many examinations of the sputum proved negative. Disappearance of all physical signs. Walking one hour and fifteen minutes twice daily. Recent reports from this patient, sputum examination negative. Feels perfectly well.

CASE 4.—Mr. H. E. V., aged 31 years. Office work. Admitted to sanatorium June 10, 1908. History of nervous prostration the winter of 1907. Family history negative. Patient indoors continually. Has been steadily losing weight. Weight on admission, 140 pounds. Slight hemoptysis May 28, 1908. Slight elevation of temperature in the evening. On examination patient had a slight tubercular infiltration of left apex. Tubercle bacilli found. He was given twelve injections of bovine tuberculin. He left the sanatorium after two months and eleven days of treatment, having gained twelve pounds in weight. Practically no cough or expectoration. Exercise three hours and a half daily. Disappearance of all physical signs. Sputum examination still positive. Subsequent report three months later, many sputum examinations negative. Present weight, 173 pounds, making 33 pounds gain over weight when admitted to sanatorium. Has no cough. Appetite and digestion good. Working twelve to sixteen hours daily.

CASE 5.—Mr. F. H., electrical engineer, aged 27 years. Admitted to sanatorium Sept. 8, 1908. Family history negative. Previous diseases, severe attack of pleurisy with effusion. Before coming into the sanatorium fluid withdrawn and specimen examined but no report. Patient well nourished. Weight on entrance, 136½ pounds. Normal weight, 143 pounds. Has slight cough and expectoration. Daily maximum temperature on admission, 100; pulse, 92; respiration, 22. Lung findings, pleuritic thickening lower anterior and posterior right lung. Sputum examination positive. Received twelve injections of bovine tuberculin. He left the sanatorium after four months, having gained 18½ pounds, twelve pounds over normal weight. Cough entirely disappeared. Slight expectoration. Many examinations of the sputum negative. Disappearance of all physical signs, excepting a few friction rubs at base of right lung. Exercise, two hours and fifteen minutes twice daily, with hill climbing.

CASE 6.—Mr. O., clerk, aged 17 years. Family history negative. Patient employed in poorly ventilated store. History of taking cold, Feb. 19, 1908. Poorly nourished with marked cachexia. Weight on entrance 133½ pounds. Cough, expectoration, night sweats, digestion impaired, daily maximum evening temperature, 101.3; pulse, 115; respiration, 36. The patient gave evidence of a moderate tubercular infiltration at left apex. Sputum findings, tubercle bacilli many in each field. Had altogether thirteen injections of bovine tuberculin. He left the sanatorium after three months and a half, having gained 21 pounds. Cough entirely disappeared. No expectoration. Many examinations of sputum, negative. Disappearance of all physical signs with no temperature. On two hours and thirty minutes' exercise twice daily at time of exit.

This I consider one of the most striking cases in this series.

On the following case the effect of the tuberculin was quite apparent:

*Case* 7.—Mr. J., telephone clerk, aged 28 years. Admitted to sanatorium Oct. 8, 1908. History of la grippe six years ago. Stated that he had malaria all winter eight years ago. Mother died of consumption seventeen years ago; also one brother in August, 1908. First symptoms in October, 1907. Weight on en-

trance, 120 pounds. Cough and expectoration. Slight elevation of temperature in the evening; pulse, 100; respiration, 20. Poorly nourished with some cachexia. Has chills and night sweats. Digestion peer. Lung findings, right apex involved. Innumerable tubercle bacilli in sputum. He received twelve injections of bovine tuberculin. He left the sanatorium after four months, having gained 27 pounds. No cough. Expectoration slight. Many examinations of the sputum negative. Disappearance of all physical signs in lung with no temperature. On one hour and forty-five minutes' exercise twice daily.

He has since returned to his work as traveling inspector for the Central Union Telephone Company. Examined this patient a few days ago, sputum examination still negative. Patient apparently well.

CASE 8.—Mr. W. N., aged 32 years, clerk, admitted to sanatorium Sept. 13, 1908. No tubercular history in family. Habits regular. Weight on admission, 121 pounds. Poorly nourished. Cough and expectoration excessive. Sputum loaded with tubercle bacilli. Has chills and night sweats with marked shortness of breath on exertion. Had one severe hemorrhage prior to admission. Daily maximum temperature on admission reported 99.5; pulse, 112. Appetite poor. Complains of extreme weakness. Chest examination revealed an active tuberculosis at left apex. In this case it seemed to me that this patient would develop an acute pulmonary process with rapid dissemination of the disease. After the second injection of bovine tuberculin his symptoms began to show decided improvement. He remained at the sanatorium five months, having gained 35½ pounds, which was 14 pounds above normal weight. Cough entirely disappeared. Expectoration slight. Physical signs at left apex practically negative. Sputum negative after many examinations. Temperature normal; pulse, 78 to 88. On one hour and thirty minutes' exercise twice daily.

CASE 9.—Mr. C. J., musician, aged 19 years. Admitted to sanatorium Aug. 4, 1908. No tubercular history in family. Had typhoid prior to admission to sanatorium. Weight on entrance, 142½ pounds. Normal weight 158 pounds. History of slight hemoptysis, July 28, 1908. Six slight indications since. Some shortness of breath on exertion. Temperature, 100; pulse, 104. Patient had a slight right apex infiltration. Sputum examination positive. Received twelve injections of bovine tuberculin. During the early days of this patient's treatment, temperature markedly erratic. He left the sanatorium after six months, having gained 29½ pounds. Cough and expectoration, none. Chest findings, negative. On two hours' exercise twice daily.

CASE 10.—Miss L. H., trained nurse, aged 22 years. Admitted to sanatorium Aug. 6, 1908. Family history negative. Slight attack of influenza winter previous to admission. This patient on admission was very poorly nourished, with marked cachexia. Excessive cough and expectoration. Tubercle bacilli were found in her expectoration. Weight on entrance, 112½ pounds. Some elevation of temperature in the evening; pulse, 103; respiration, 22. Chest examination revealed an active tubercular infiltration of both apices. The improvement in her case was remarkable after the first few injections. Altogether she received twelve injections of bovine tuberculin. She left the sanatorium after five months, having gained 23½ pounds, 12½ pounds over normal weight. Cough and expectoration practically disappeared. Disappearance of all physical signs with normal temperature. On one hour and a half to two hours' exercise twice daily. Many examinations of the sputum proved negative. Subsequent history three months later, no cough with slight expectoration. Sputum examination negative. Temperature normal. Present weight, 136 pounds. On three hours daily exercise. Sleeping quarters, porch tent.

This case impressed me very much on account of the rapidity of improvement in a case where I had every reason to believe there would be an acute tuberculosis of both lungs.

CASE 11.—Miss E. W., nurse, aged 32 years. Gave history of severe cold four years ago. Also one in February, 1908. Weight on entrance, 95 pounds. Poorly nourished. Cough and expectoration. Tires easily on exertion. Daily maximum evening temperature normal. Pulse slightly accelerated. Chest examination re-

vealed slight tuberculosis of right apex. Sputum findings, tubercle bacilli present. This patient left the sanatorium after five months, having gained twenty-five and a half pounds. Frequent examinations of the sputum negative. No cough or expectoration. On one hour and forty-five minutes' exercise twice daily. Disappearance of all physical signs.

CASE 12.—A progressively downward course in the following case seemed inevitable. The rapid improvement in this patient's condition when tuberculin was employed demonstrated in the most convincing manner its marked healing effect.

Mrs. Q. P., housewife, aged 27 years. Admitted to sanatorium July 12, 1908. Brother died of tuberculosis four years ago. Typhoid fever four years ago. History of malaria two years ago. Commenced to cough at this time. Cough and expectoration on admission excessive. Very poorly nourished with marked cachexia. Hemoglobin, 60. Weight, 111 pounds. Has night sweats with some diarrhea. Marked shortness of breath on exertion. Daily maximum temperature on admission, 102; pulse, 100; respiration, 25. Complete loss of voice. Examination of larynx revealed tubercular ulceration posterior third left vocal cord, and marked infiltration interarytenoid space. Examination of the chest revealed a slight tubercular infiltration of left apex. Examination of the sputum, tubercle bacilli innumerable. After temperature was reduced by absolute quiet, began the administration of bovine tuberculin. She left the sanatorium after five months, having gained 34½ pounds. Many examinations of the sputum proved negative. Hemaglobin, 95. Cough very slight. Expectoration, none. No hoarseness. Laryngeal findings, tubercular ulcer on posterior third left vocal cord healed. Still a slight infiltration in the interarytenoid space. Evidence of healed lesion at right apex. Temperature, 98.4; pulse, 94; no dyspnea. On one hour and thirty minutes exercise twice daily. Appetite excellent.

There are eleven remaining cases in this series upon which I might report, but time and space forbids. These were also treated with the bovine tuberculin. Two of them were classified on admission as moderately advanced.

In this group of twenty-three incipient cases in which the bovine tuberculin was employed the average length of sanatorium treatment was four months. Adopting the classification on discharge of the National Association, the results were as follows:

16 apparent cures.
6 disease arrested.
1 death.

The other series of twenty-three cases comprises seven incipient cases in which Koch's B. E. was administered and sixteen incipient cases in which the tuberculin was not used. The average length of sanatorium treatment in this group was also four months.

The results on discharge in the seven cases who received Koch's B. E. were as follows:

1 apparent cure.
4 disease arrested.
2 improved.

The results of sanatorium treatment in the sixteen remaining cases without the use of tuberculin were as follows:

14 disease arrested.
2 deaths.

The total results on discharge in the twenty-three cases of the latter series were as follows:

1 apparent cure.
18 disease arrested.
2 improved.
2 deaths.

In view of the results obtained in this series of cases and from observation of cases now under treatment I am convinced that a tuberculin prepared from bovine sources has a marked and healing effect in tuberculosis of the lungs. Experience teaches one that there is frequently a marked disproportion between the physical signs and the general condition of the patient. Many with slight activity of the tuberculous process and with slight lesions, in the presence of other virulent micro-organisms, have been forced to an irresistible decline. These are not suitable cases for the exhibition of tuberculin, and, although there is some uncertainty in the action of the autogenetic vaccines, the desperate character of the cases to which these are given is a justification for their employment.

Secondly, if the patient's natural resistance to his tuberculosis is lowered, efforts must be made to improve this condition by complete rest, nutritious food and pure air. Tuberculin will not help if these potent agents fail.

Thirdly, the tuberculous infection must be limited either to one lobe of a lung or two small areas in both lungs. If cavitation has occurred and general constitutional involvement, tuberculin has little or no lasting effect.

Fourthly, the age of the patient must be taken into account. The younger the patient the more readily do they respond to the action of tuberculin.

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## CUTANEOUS REACTIONS OF TUBERCULIN.*

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When Robert Koch[1] announced his great discovery of the tubercle bacillus and later published his more elaborate work,[2] the hope was entertained that a method was at hand by which an early and positive diagnosis of tuberculosis might be made. There is no doubt that this hope was in great part realized by the systematic and repeated examination of the sputum, but, with the increased knowledge of the nature of the infection and its pathology, the importance of detecting the condition before bacilli are present in the sputum has become more and more apparent. Strictly speaking, when the bacilli are present in the sputum the process is an "open tuberculosis." Consequently the hope is now entertained that the diagnosis may be made before this change

* Read at the Fifty-Ninth Annual Session of the Illinois State Medical Society, Quincy, Ill., May 18, 19, 20, 1909.

1. Berliner klin. Wochenschrift, 1882.
2. Mittheilungen a. d. k. Gesundheitsamte.

has occurred. One of the factors in the failure of the sanitarium treatment of tuberculosis is to be found in a late diagnosis, when the condition is moderately or far advanced. Such observers as Gerhardt,[3] Eichhorst,[4] Grancher[5] and Turban[6] recognized the non-importance of the bacilli in the sputum and the possibility of making a positive diagnosis in their absence. As neither the symptoms nor the signs in the early incipient cases are diagnostic, the announcement by Koch[7] of his tuberculin for diagnostic and therapeutic purposes was hailed with great joy and expectation. It is not necessary to relate the disappointment, discredit and disuse which soon followed; this was to be expected when its mis-use is considered. There can be but little doubt of the utility afforded by the use of tuberculin in diagnosis. It must, however, be thoroughly understood that, while of the utmost assistance, it is only a valuable adjunct, to be considered in association with physical signs and symptoms, confirmatory evidence of the presence of tuberculosis. In the presence of bacilli in the sputum or a pulmonary hemorrhage a tuberculin test is relatively of but little value. It is in the incipient and doubtful cases where it is of the greatest value, for such cases with proper treatment can not only be cured but is a great financial saving when compared with the months or years of care required in the more advanced and hopeless cases. Although Trudeau,[8] Möller, Wilkinson[9] and many others have assured us of the harmlessness of tuberculin when properly employed, there is, nevertheless, a strong prejudice against its general use subcutaneously as a diagnostic agent. In selected cases and in the hands of those skilled in its use little or no harm may be done, but it certainly is not adapted for general use. The interest in tuberculin and its great value as a diagnostic agent was revived when von Pirquet[10] announced his method of vaccination as a test in tuberculosis. The ocular method of Wolff-Eisner,[11] and almost simultaneously that of Calmette,[12] soon followed, as well as several others. During the past few months one or more of the local tests have been employed with the object of determining the individual and comparative merits in the diagnosis of tuberculosis.

The tests employed were:

1. Scarification, vaccination or cutaneous method of von Piquet.[10]
2. The ointment or percutaneous method of Moro.[13]
3. The dermo-reaction method of Ligniéres.[14]
4. The differential scarification method of Detre[15] for diagnosis and therapy.

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3. Lehrbuch der Auscul. u. Percuss. 1890.
4. Handbuch der spec. Path. u. Therap., 1897.
5. Maladies de l'Appareil respiratoire, 1890.
6. Beiträge zur Kenntnis der Lungen Tuberculosis, 1899.
7. Deutsche med. Wochenschrift, No. 46, 1890.
8. Amer. Journal Med. Sciences, August, 1906.
9. Treatment of Consumption, 1908.
10. Wiener med. Wochenschrift 1907, Nos. 27 and 28.
11. Beiträge zur. klin. der Tuberculosa, Bd. ix.
12. Acad. d. Sc., 1907, cxliv.
13. Munch. med. Wochenschrift, 1908, lv, 216.
14. International Tuber. Congress, Washington, 1908.
15. Wiener klin. Wochenschrift, 1908, xxi, 173.

As the subcutaneous use of tuberculin is contraindicated in certain conditions, especially in the presence of a pyrexia, while one of the local tests may be employed, a just comparison of the relative value is impossible. For some months past the ocular reaction has not been employed except in a few selected cases, as the same information can be obtained by one of the cutaneous tests unassociated with the danger of doing harm. The rhino-tuberculin and pharyngeal tuberculin tests are not easy of execution and have been employed in only a limited number of cases. In some of the questionable cases the Stichreaktion, first described by Epstein and Escherich but studied more especially by Klingmüller and Hamberger, has been performed; not, however, in a sufficient number to be of any value. Excluding, then, the subcutaneous, ocular, Stichreaktion, rhino and pharyngeal methods, the local cutaneous reactions may be considered.

Description of methods employed.

SCARIFICATION, VACCINATION OR CUTANEOUS METHOD OF VON PIRQUET.

The technic followed was that described by the originator. Generally, the inner surface of the fore arm was selected as the site for the test. The skin was cleansed by a few vigorous rubs with cotton moistened with ether, then two drops of undiluted tuberculin T. O. were placed upon the surface, the drops being about two inches apart. In order that a comparison of the results may be made a scarifier or scratcher (Schaber) was employed capable of producing a uniform area. After carefully sterilizing by heating or with carbolic and alcohol, the central scarification was made mid-way between the two drops by one or two turns of the instrument. Then a similar scarification was made with the point of the instrument inserted first in one and then the other drop of the tuberculin. A very slight pressure is made in order to remove only the most superficial layers of the epithelium, as it is unnecessary and undesirable to draw blood. A small piece of cotton is then placed on each of the drops of tuberculin and allowed to dry for three to five minutes. When this is not done, after waiting the specified length of time, the excess of tuberculin may be rubbed on the opposite forearm by means of the tip of one of the fingers as described in the dermo-reaction. When positive, in the course of a few hours such a test is characterized by a slight hyperemia to an acute inflammatory reaction at the site of the application of the tuberculin; the control remains unchanged. The test is not attended by a chill, fever, malaise or the manifestations of a subcutaneous reaction.

Jules Lemaire[16] subdivides the reaction into three groups, as follows:

Feeble Reaction.—In which the hyperemic area measures from 4 to 6 mm. in diameter, with but a slight surrounding swelling and redness.

Medium Reaction.—In which the hyperemic area measures from 6 to 12 mm., with numerous surrounding papules and with considerable swelling and redness.

16. Revue de la Tuberculose, June, 1908.

Strong Reaction.—In which the hyperemic area measures from 2 to 3 cm.; with many papules, some of which are vesicular or pustular, and with much surrounding swelling and redness.

This classification has been employed and is indicated in the tables by the use of the plus sign, one, two or three, to indicate the degree.

### THE OINTMENT OR PERCUTANEOUS METHOD OF MORO.

The preparation employed was a 50 per cent. mixture of tuberculin T. O. and anhydrous lanolin. Without any previous preparation of the surface about 15 grs. of the ointment was rubbed for about one minute on the skin of the abdomen, submaxillary region or the inner surface of the forearm. A corresponding area on the opposite side of the body was employed as a control. When positive the test is characterized in the course of a few fours by the appearance of papules and an area of hyperemia. Moro also subdivides the reaction into three groups, as follows:

Weak Reaction.—From two to ten papules measuring from 1 to 2 mm. in diameter, unaccompanied with itching or irritation.

Medium Reaction.—Ten to one hundred papules, some vesicular measuring about 3 mm. in diameter; accompanied by itching, irritation and considerable hyperemia.

Strong Reaction.—One hundred or more papules, some vesicular, others pustular, measuring more than 3 mm. and accompanied by much itching, discomfort and inflammation. The one, two or three plus sign is employed to indicate the degree.

### DERMO REACTION METHOD OF LIGNIÉRES.

According to the description of the author the inner surface of the arm at the level of the biceps is the usual site selected for the test. From five to six large drops of the crude tuberculin T. O. are rubbed upon the surface. The reaction is identical to that obtained after the use of the ointment.

### DIFFERENTIAL SCARIFICATION METHOD OF DETRE.

This is a modification of the von Pirquet method, consisting of the application to the skin of three different substances at the same time. Four scarifications are made—one for the control, one for the concentrated old tuberculin, one for a filtrate of a culture of human tubercle bacilli and one for a filtrate of a culture of bovine tubercle bacilli.

Since Robert Koch in 1901 announced that "human and bovine tuberculosis were distinct and separate" many investigators have studied the dualism of the tubercle bacillus. Nathan Raw and others have subdivided the various forms of tuberculosis into two clinical types, the typus humanus and the typus bovinus.

The human type of the bacillus is made responsible for:

1. Pulmonary tuberculosis.
2. Ulceration of the intestines and
3. Tuberculous laryngitis.

While the bovine type is held accountable for:

1. Tuberculous peritonitis.
2. Tuberculosis of the lymphatic glands.
3. Acute miliary tuberculosis.
4. Tuberculous joints.
5. Tuberculous meningitis, and
6. Lupus.

It has also been observed that these various lesions are antagonistic to each other. The determination of the probable type of infection becomes of the greatest importance in the treatment with tuberculin. As a bacteriologic diagnosis is so often impossible, this test, if found reliable, will be of the utmost value. Detre's investigations, confirmed by Berend, Heim and John, and von Gebhardt, showed a positive reaction to the human tuberculin in more than 90 per cent. of the cases of pulmonary tuberculosis; while in visceral and surgical cases in adults one-third to one-half reacted to the bovine tuberculin. According to this method the reactions are designated as "dominant" and "concomitant"; the difference, however, is often very slight. When both filtrates are injected simultaneously there is manifest a greater tolerance for the toxin corresponding to the concomitant reaction; while there is a marked intolerance for the corresponding toxin to the dominant reaction. This indicates the form of tuberculin to be employed therapeutically, and, while immunity may be produced by either, it is much more easily accomplished by the concomitant filtrate.

The reaction is also of service as a regulator of the therapeutic dose of tuberculin. Instead of producing immunity an intolerance may be produced by an improper dose. This is manifest by a local or general reaction and the intensification or reappearance of the reaction long after it has disappeared.

To understand the result of these tests, some of which are apparently contradictory, it is necessary to consider the question of tuberculin specificity, its mode of production and why the reaction may fail to occur in the presence of tuberculosis. As to the specificity in tuberculin tests, the autopsy only can be the deciding evidence. This manifestly is impossible in man, but there is abundant and convincing evidence furnished by control animals, the excellent opportunity offered by the application of tuberculin in veterinary practice and recently by reported findings in fatal cases where some form of a tuberculin had been employed. Frankel collected 8,000 observations in cattle in which the tuberculin reaction and the autopsy findings coincided in but a fraction over 2 per cent. Voges, in 7,327, found a difference of only 2.7 per cent. Von Pirquet reports 1,600 children on which the vaccination had been done. Of these 200 died and were examined carefully at autopsy. During life 68 of the 200 were found positive to the reaction, while at the autopsy macroscopic tubercles were found in 66. In one of the remaining cases pleuritic adhesions were present and probably tubercular.

In the whole domain of medicine there is no other subject of more interest or enveloped in greater mystery than that of the reaction to tuberculin and the mechanism by which an immunity is produced.

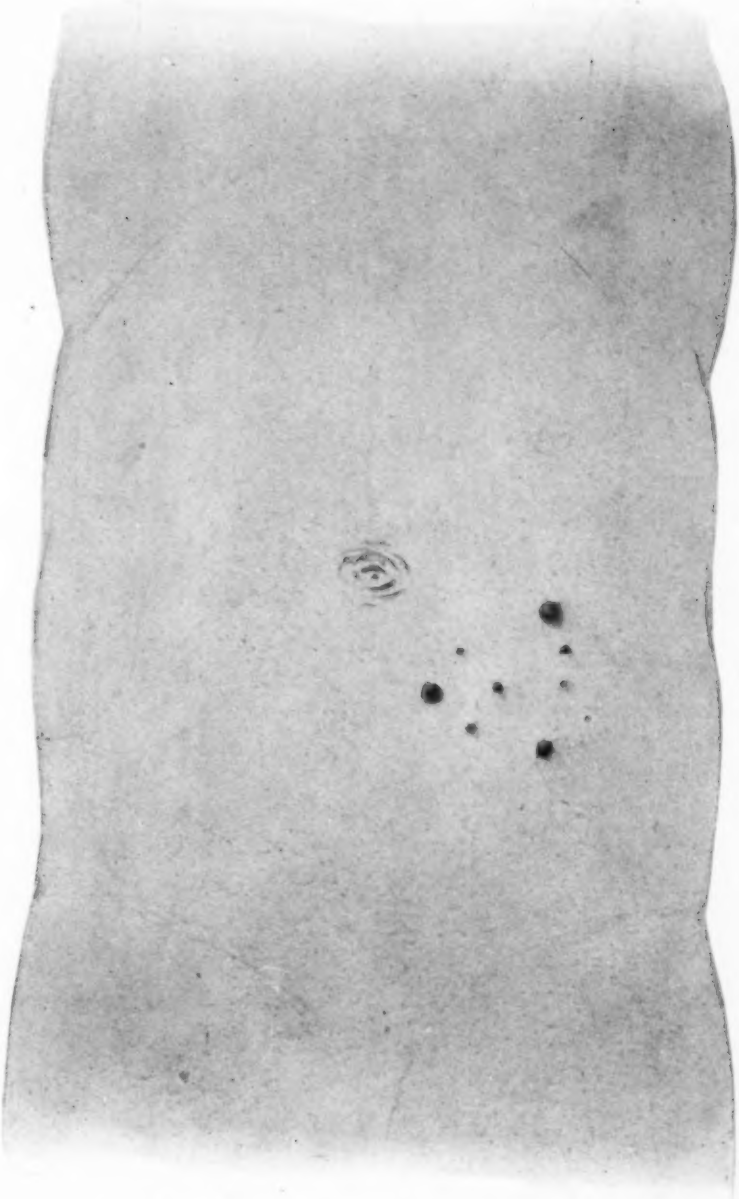

Fig. 1.—Reaction to the ointment test of Moro—mild. (+).

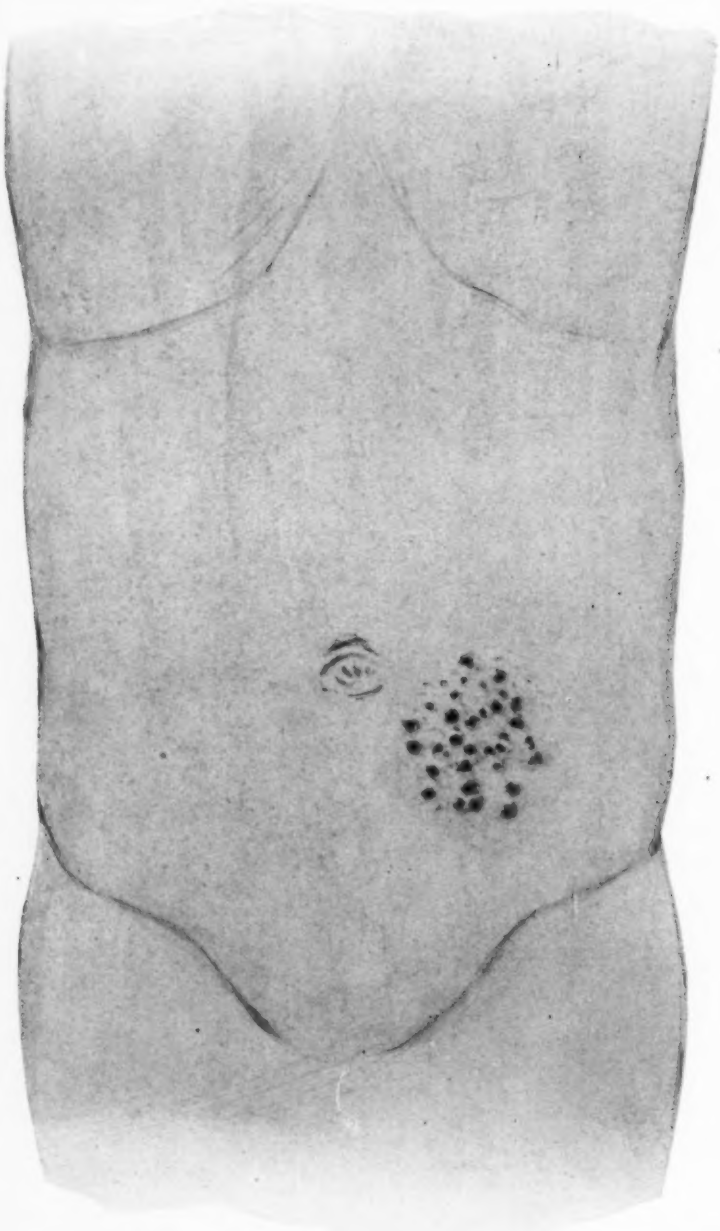

Fig. 2.—Reaction to the ointment test of Moro—moderate. (++).

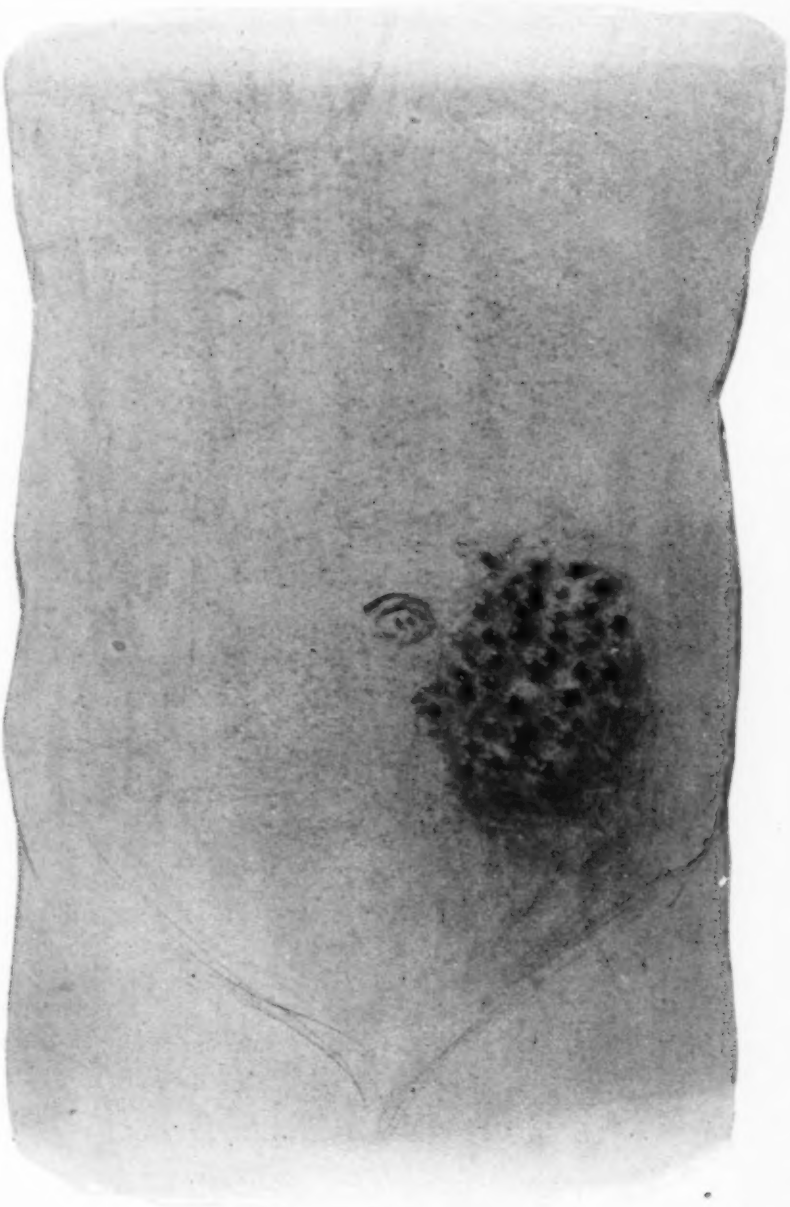

Fig. 3.—Reaction to the ointment test of Moro—severe. (+++).

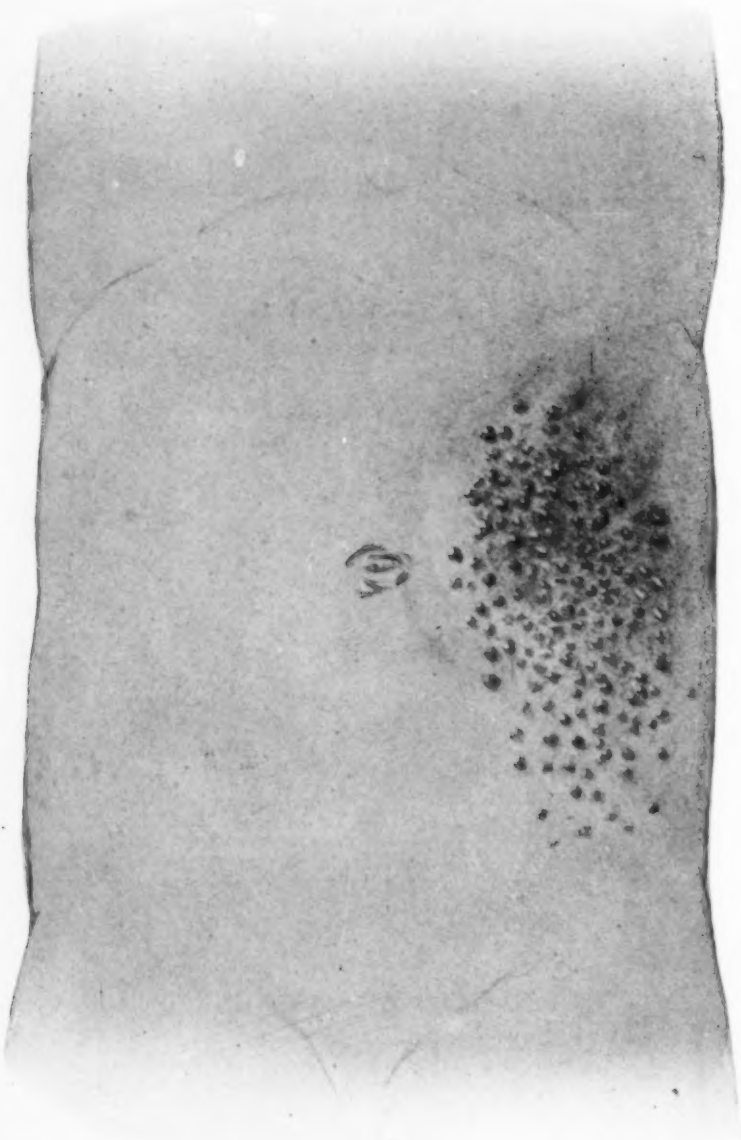

Fig. 4.—Return reaction to the ointment test, following the subcutaneous injection of tuberculin, fourteen days later.

Fig. 5.—Reaction to the test of Ligniéres.

Fig. 6.—Reaction to Detre test.

Fig. 7.—Reaction to von Pirquet test.

Why an extremely small amount of a toxin should produce such a marked and often violent change in the tissue cells is not easy to understand. When tuberculin is used subcutaneously, producing a reaction, it is characterized by certain features—a pyrexia, constitutional symptoms, local reaction and focal manifestations. In the cutaneous tests only one of these is made use of, the local reaction, but the underlying principle of the reaction is the same in all. The generally accepted theory, one which is most in accord with clinical experience, is that of hypersusceptibility, first demonstrated by Löwenstein and since described by von Pirquet under the terms Allergie and anaphylaxis. This condition of hypersusceptibility is the fundamental cause in the production of serum diseases and is a property common to all albuminous bodies. Von Pirquet states that the reaction is dependent on the presence of antibodies. In their absence no reaction is produced as in the case with a normal individual. In an advanced stage of tuberculosis or in a miliary type of the disease no reaction occurs, as the antibodies are wanting. During an attack of measles, as first demonstrated by von Pirquet, the reaction disappears temporarily, as the antibodies are not present.

MATERIAL USED.

Some form of a cutaneous test was employed in 235 cases, 91 of which were children in the dispensary and the remaining 144 in the various wards of the County Hospital. Counting the Detre scarification as one, a total of 356 tests were made, as two were frequently made at the same time on the one patient. Of the 235 cases, including the suspects, 110 were diagnosed clinically as tubercular, of which 73, or 66.36 per cent., gave a positive reaction, while 17, or 13.6 per cent., of the non-tubercular gave a positive reaction.

In 20 tubercular cases where the scarification and ointment tests were done simultaneously all reacted, except in one, where the ointment gave a negative result, while the scarification was positive. The same tests were applied to 40 cases considered non-tubercular, with a positive result in 10, of which 7 reacted to both, 1 to the scarificatoin and 2 to the ointment. The scarification and the dermo tests were applied simultaneously to 14 suspects, with uniform results in 5 cases. Exclusive of the Detre test, the scarification and dermo were applied in 14 suspects with uniform results, 5 being positive.

The Detre differential was employed in 50 cases, 44 of which were diagnosed tubercular, 1 suspect, and 5 were infants a few months old that had been fed on cows' milk. A positive reaction was obtained in 32, or 72.7 per cent., of the 44 tubercular cases. With the exception of 2 all the 32 cases gave a dominant reaction to the old tuberculin; in one, a tubercular peritonitis, the bovine filtrate was the dominant one, and in the remaining case the old tuberculin and the bovine filtrate reacted with the same degree. In 10 of the 32, practically one-third, gave a very pronounced reaction to the bovine filtrate.

All of the infants on artificial food were negative to the test.

Some of the conclusions which appear justifiable:

1. Tuberculin, as a means of diagnosis, is a most valuable agent, but must be considered only from the standpoint of corroborative evidence. A positive reaction to tuberculin indicates the presence of tuberculosis, but physical findings and symptoms must be considered, for a tuberculosis may exist and fail to give a reaction.

2. The cutaneous tests are to be preferred to the subcutaneous or the ocular methods, as there are no associated dangers or undesirable results.

3. The percutaneous method of Moro, for certain reasons, seems to be preferable. It is easily applied without objection on the part of the patient or relatives. This is not the case with the von Pirquet, owing to the quite general antipathy to any form of vaccination and as the test in children is not infrequently associated with excitement and crying. The results are quite as constant and when a difference occurs it is in favor of the ointment. The dermo is not so reliable, and this may be due to the difficulty in applying as compared to the ointment, as the upper layers of the epidermis forms in rolls and is rubbed off.

4. The more youthful the patient, the more valuable the test. When autopsy records are examined, with the view of determining the frequency of some form of tuberculosis, practically present in all adults, the unimportance of a positive test, without other findings, becomes

TABLE 1.—CASES IN WHICH THERE WERE CLINICAL EVIDENCES OF TUBERCULOSIS. SCARIFICATION AND OINTMENT.

| Case. | Name. | Age. | Diagnosis. | Test. | Pos. + Neg. — | Maximum Reaction Hours. | Degrees. | Control. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| 1. | A. G. | 12 | Tubercular Arthritis. | Scar. | + | 48 | ++ | neg. | |
| | | | | Oint. | + | 48 | ++ | neg. | |
| 2. | M. K. | 8 | Tubercular Arthritis and Osteomyelitis. | Scar. | + | 48 | + | neg. | |
| | | | | Oint. | — | 48 | ..... | .... | |
| 3. | M. P. | 9 | Tubercular Meningitis. | Scar. | + | 72 | + | neg. | |
| | | | | Oint. | + | 72 | + | neg. | |
| 4. | S. V. | 9 | Tubercular Meningitis, Peritonitis, Pul. Phthisis. | Scar. | — | .. | ..... | .... | |
| | | | | Oint. | — | .. | ..... | .... | |
| 5. | E. T. | 13 | Pulmonary Tuberculosis. | Scar. | — | .. | ..... | .... | |
| | | | | Oint. | — | .. | ..... | .... | |
| 6. | L. J. | ½ | Pulmonary Tuberculosis. | Scar. | — | .. | ..... | .... | |
| | | | | Oint. | — | .. | ..... | .... | |
| 7. | G. L. | 13 | Pulmonary Tuberculosis. | Scar. | — | .. | ..... | .... | |
| | | | | Oint. | — | .. | ..... | .... | |
| 8. | T. V. | 7 | Tubercular Hip. | Scar. | + | 48 | ++ | neg. | |
| | | | | Oint. | + | 48 | + | neg. | |
| 9. | A. S. | 7 | Tubercular Hip. | Scar. | + | 48 | ++ | neg. | |
| | | | | Oint. | + | 48 | ++ | neg. | |
| 10. | T. McG. | 5 | Tubercular Hip. | Scar. | + | 48 | ++ | neg. | |
| | | | | Oint. | + | 48 | ++ | neg. | |
| 11. | J. D. | 9 | Tubercular Hip. | Scar. | + | 48 | ++ | neg. | |
| | | | | Oint. | + | 48 | ++ | neg. | |
| 12. | D. S. | 3 | Tubercular Adenitis. | Scar. | + | 48 | ++ | neg. | |
| | | | | Oint. | + | 48 | ++ | neg. | |
| 13. | M. T. | 7 | Tubercular Spine. | Scar. | + | 48 | + | neg. | |
| | | | | Oint. | + | 48 | ++ | neg. | |
| 14. | J. S. | 7 | Tubercular Spine. | Scar. | + | 48 | ++ | neg. | |
| | | | | Oint. | + | 48 | ++ | neg. | |
| 15. | C. K. | 7 | Tubercular Spine. | Scar. | + | 48 | ++ | neg. | |
| | | | | Oint. | + | 48 | ++ | neg. | |
| 16. | A. | 5 | Tubercular Spine, Cervical. | Scar. | — | .. | ..... | .... | |
| | | | | Oint. | — | .. | ..... | .... | |
| 17. | F. W. | 8 | Tubercular Spine. Double Tubercular Hip. | Scar. | + | 48 | + | neg. | |
| | | | | Oint. | + | 48 | ++ | neg. | |
| 18. | G. H. | 6 | Tubercular Spine. | Scar. | + | 48 | ++ | neg. | |
| | | | | Oint. | + | 48 | ++ | neg. | |
| 19. | J. S. | 4 | Tubercular Adenitis, Cervical. | Scar. | + | 24 | +++ | neg. | Dispensary. |
| | | | | Oint. | + | 24 | +++ | neg. | |
| 20. | E. G. | 3 | Tubercular Adenitis, Cervical. | Scar. | + | 48 | + | neg. | |
| | | | | Oint. | + | 48 | + | neg. | |

TABLE 2.—CASES IN WHICH THERE WERE NO CLINICAL EVIDENCES OF TUBERCULOSIS. SCARIFICATION AND OINTMENT.

| Case. | Name. | Age. | Diagnosis. | Test. | Pos. + Neg.— | Maximum Reaction Hours. | Degree. | Control. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| 1. | M. G. | 6 | Pneumonia, Lobular. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 2. | G. C. | 3 | Pneumonia, Lobular. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 3. | H. L. | 14 | Brain Tumor. | Scar. | — | .. | .... | .... | Postmortem: |
| | | | | Oint. | — | .. | .... | .... | Brain Tumors, no tuberculosis |
| 4. | S. R. | 3 | Tonsillitis, Cervical Adenitis. | Scar | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 5. | C.Van A. | 8 | Tonsillitis. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 6. | N. P. | 8 | Vaginitis. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 7. | R. P. | 9 | Vaginitis. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 8. | O. V. | 12 | Vaginitis. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 9. | E. B. | 11 | Vaginitis. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 10. | S. P. | 7 | Vaginitis. | Scar. | + | 48 | + | neg. | |
| | | | | Oint. | + | 48 | ++ | neg. | |
| 11. | M. C. | 9 | Vaginitis. | Scar. | + | 48 | + | neg. | |
| | | | | Oint. | + | 48 | ++ | neg. | |
| 12. | L. B. | 3 | Vaginitis. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 13. | M. P. | 3 | Vaginitis. | Scar. | — | .. | .... | .... | |
| | | | | Oint | — | .. | .... | .... | |
| 14. | L. C. | 5 | Vaginitis, Eczema. | Scar. | + | 48 | + | neg. | |
| | | | | Oint. | — | .. | .... | .... | |
| 15. | L. T. | 11 | Vaginitis. | Scar. | + | 48 | + | neg. | |
| | | | | Oint. | + | 48 | + | neg. | |
| 16. | A. P. | 8 | Congenital Syphilis, Cervical Abscesses. | Scar. | + | 48 | + | neg. | |
| | | | | Oint. | + | 48 | ++ | neg. | |
| 17. | R. S. | 5 | Genu Varum. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 18. | L. M. | 7 | Genu Varum. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 19. | H. P. | ½ | Congenital Syphilis, Epilepsy. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 20. | F. P. | 9 | Burns. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 21. | E. A. | 9 | Burns. | Scar. | — | .. | ... | neg. | Reaction slight |
| | | | | Oint. | + | 48 | + | .... | |
| 22. | Q. R. | 10 | Adenitis Cervical. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 23. | J. R. | 10 | Fracture Humerus. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 24. | C. S. | 8 | Fracture Tibia. | Scar. | + | 48 | + | neg. | |
| | | | | Oint. | + | 48 | + | neg. | |
| 25. | T. B. | 10 | Otitis Media, Chr. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 26. | H. B. | 5 | Otitis Media, Bronchitis. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 27. | D. S. | 3 | Scabies. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 28. | E. R. | 8 | Scabies. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 29. | L. S. | ⅔ | Malnutrition. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 30. | M. C. | ⅔ | Malnutrition. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 31. | H. S. | 2 | Eczema. | Scar | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 32. | M. F. | 4 | Mastoiditis. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 33. | H. W. | 3 | Mastoiditis. | Scar. | — | 24 | .... | neg. | Reaction slight. |
| | | | | Oint. | + | 24 | + | .... | |
| 34. | C. O. | 9 | Endocarditis. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 35. | E. P. | 5 | Acute Articular Rheumatism. | Scar. | — | .. | .... | .... | |
| | | | | Oint. | — | .. | .... | .... | |
| 36. | W. C. | 8 | Traumatic Injury; Am. of Foot. | Scar. | + | 48 | ++ | neg. | |
| | | | | Oint. | + | 48 | + | neg. | |
| 37. | T. M. | 11 | Non-Tubercular. | Scar. | + | 72 | + | neg. | Dispensary, family neg. |
| | | | | Oint. | + | 72 | + | neg. | |
| 38. | C. S. | 5 | Non-Tubercular. | Scar. | — | .. | .... | .... | Father tubercular. |
| | | | | Oint. | — | .. | .... | .... | |
| 39. | R. G. | 9 | Non-Tubercular. | Scar. | — | .. | .... | neg. | Family neg. |
| | | | | Oint. | — | .. | .... | .... | |
| 40. | W. M. | 2 | Pneumonia Lobular. | Scar. | — | .. | .... | neg. | |
| | | | | Oint. | — | .. | .... | .... | |

TABLE 3.—CASES IN WHICH THERE WERE CLINICAL EVIDENCES OF TUBERCULOSIS. SCARIFICATION.

| Case. | Name. | Age. | Diagnosis. | Reaction. | Pos. + Neg.— | Maximum Reaction Hours. | Control. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| 1. | M. J. | 11 | Pulmonary Tuberculosis. | Scar. | + | 48 | ++ | Mother tubercular. |
| 2. | E. S. | 7 | Pulmonary Tuberculosis. | Scar. | + | 70 | + | Mother tubercular. |
| 3. | W. L. | 14 | Pulmonary Tuberculosis. | Scar. | + | 48 | + | Brother tubercular. |
| 4. | L. DeP. | 12 | Pulmonary Tuberculosis. | Scar. | — | .. | ..... | Family negative. |
| 5. | N. S. | 8 | Pulmonary Tuberculosis. | Scar. | + | 40 | ++ | Mother tubercular. |
| 6. | A. M. | 13 | Pulmonary Tuberculosis. | Scar. | + | 48 | ++ | Sister tubercular. |
| 7. | E. S. | 7 | Suspect. | Scar. | + | 70 | + | Mother tubercular. |
| 8. | H. G. | 9 | Suspect. | Scar. | + | 48 | ++ | Mother tubercular. |
| 9. | E. G. | 8 | Suspect. | Scar. | + | 48 | + | Mother tubercular. |
| 10. | G. O. | 13 | Suspect. | Scar. | — | .. | ..... | Family negative. |
| 11. | G. F. | 7 | Suspect. | Scar. | — | .. | ..... | Family negative. |
| 12. | M. R. | 3 | Suspect. | Scar. | + | 36 | +++ | Father tubercular. |
| 13. | N. T. | 11 | Suspect. | Scar. | + | 48 | ++ | Father tubercular. |
| 14. | E. A. | 12 | Suspect. | Scar. | + | 36 | +++ | Father tubercular. |
| 15. | R. A. | 11 | Suspect. | Scar. | + | 36 | ++ | Father tubercular. |
| 16. | L. A. | 6 | Suspect. | Scar. | + | 48 | + | Father tubercular. |
| 17. | A. A. | 8 | Suspect. | Scar. | + | 48 | + | Father tubercular. |
| 18. | E. J. | 8 | Suspect. | Scar. | + | 48 | + | Father and mother tubercular. |
| 19. | J. J. | 12 | Suspect. | Scar. | + | 36 | ++ | Father and mother tubercular. |
| 20. | L. H. | 4 | Suspect. | Scar. | + | 48 | ++ | Mother tubercular. |
| 21. | L. P. | 9 | Suspect. | Scar. | + | 24 | +++ | Family negative. |

TABLE 4.—CASES IN WHICH THERE WERE NO CLINICAL EVIDENCES OF TUBERCULOSIS. SCARIFICATION.

| Case. | Name. | Age. | Diagnosis. | Reaction. | Pos. + Neg.— | Maximum Reaction Hours. | Degree. | Control. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| 1. | H. R. | 8 | Non-tubercular | Scar. | — | .. | .... | .... | Family negative. |
| 2. | T. L. | 8 | Non-tubercular | Scar. | — | .. | .... | .... | Family negative. |
| 3. | H. B. | 15 | Non-tubercular | Scar. | + | 30 | ++ | neg. | Family negative. |
| 4. | T. C. | 12 | Non-tubercular | Scar. | — | .. | .... | .... | Family negative. |
| 5. | M. K. | 9 | Non-tubercular | Scar. | + | 48 | + | neg. | Mother tubercular. |
| 6. | O. K. | 1½ | Non-tubercular | Scar. | — | .. | .... | .... | Mother tubercular. |
| 7. | J. K. | 4 | Non-tubercular | Scar. | — | .. | .... | .... | Mother tubercular. |
| 8. | J. V. | ½ | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 9. | E. V. | 4 | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 10. | R. B. | 1 | Non-tubercular | Scar. | — | .. | .... | .... | Family negative. |
| 11. | M. B. | 5 | Non-tubercular | Scar. | — | .. | .... | .... | Family negative. |
| 12. | D. S. | 2 | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 13. | W. S. | 13 | Non-tubercular | Scar. | — | .. | .... | .... | Mother tubercular. |
| 14. | L. S. | 5 | Non-tubercular | Scar. | — | .. | .... | .... | Mother tubercular. |
| 15. | J. E. | 11 | Non-tubercular | Scar. | — | .. | .... | .... | Sister tubercular. |
| 16. | M. B. | 3 | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 17. | E. C. | 14 | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 18. | J. C. | 9 | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 19. | J. H. | 3 | Non-tubercular | Scar. | — | .. | .... | .... | Mother tubercular. |
| 20. | S. N. | 13 | Non-tubercular | Scar. | — | .. | .... | .... | Mother tubercular. |
| 21. | M. K. | 12 | Non-tubercular | Scar. | — | .. | .... | .... | Father and mother tubercular. |
| 22. | J. K. | 8 | Non-tubercular | Scar. | — | .. | .... | .... | |
| 23. | F. S. | ½ | Non-tubercular | Scar. | — | .. | .... | .... | Father and mother tubercular. |
| 24. | A. S. | 14 | Non-tubercular | Scar. | — | .. | .... | .... | |
| 25. | J. C. | 6 | Non-tubercular | Scar. | — | .. | .... | .... | Family negative. |
| 26. | P. C. | 9 | Non-tubercular | Scar. | — | .. | .... | .... | Brother tubercular. |
| 27. | L. R. | 6 | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 28. | A. R. | 9 | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 29. | B. R. | 11 | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 30. | W. R. | 13 | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 31. | R. R. | 12 | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 32. | J. L. | 12 | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 33. | W. S. | 6 | Non-tubercular | Scar. | — | .. | .... | .... | Family negative. |
| 34. | B. M. | 4 | Non-tubercular | Scar. | — | .. | .... | .... | Family negative. |
| 35. | A. L. | 10 | Non-tubercular | Scar. | + | 48 | + | neg. | Family negative. Sister tubercular. |
| 36. | M. L. | 7 | Non-tubercular | Scar. | + | 48 | ++ | neg. | |
| 37. | E. A. | 14 | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 38. | W. A. | 8 | Non-tubercular | Scar. | + | 48 | + | neg. | Father tubercular. |
| 39. | C. P. | 1½ | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 40. | J. P. | ½ | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 41. | J. J. | 4 | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 42. | R. J. | 1 | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |
| 43. | J. M. | 7 | Non-tubercular | Scar. | — | .. | .... | .... | Father tubercular. |

TABLE 5.—CASES IN WHICH THERE WERE CLINICAL EVIDENCES OF TUBERCULOSIS. OINTMENT.

| Case. | Name. | Age. | Diagnosis. | Reaction. | Pos. + Neg. — | Maximum Reaction Hours. | Degree. | Control. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| 1. | S. M. | 2 | Tubercular Peritonitis | Oint. | + | 48 | ++ | neg. | |
| 2. | C. S. | 2 | Tubercular Meningitis. | Oint. | — | .. | ..... | .... | Applied few hours before death. |
| 3. | I. D. | 4 | Tubercular Hip. | Oint. | + | 36 | +++ | neg. | |
| 4. | H. B. | 5 | Tubercular Spine. | Oint. | + | 48 | +++ | neg. | |
| 5. | H. M. | 8 | Tubercular Hip. | Oint. | + | 48 | +++ | neg. | |
| 6. | H. F. | 1½ | Tubercular Spine. | Oint. | + | 48 | +++ | neg. | |
| 7. | A. J. | 2 | Tubercular Spine. | Oint. | + | 48 | +++ | neg. | |
| 8. | A. P. | 2 | Tubercular Spine. | Oint. | — | .. | ..... | .... | |
| 9. | W. K. | 5½ | Tubercular Adenitis, Cervical. | Oint. | + | 48 | ++ | neg. | |
| 10. | H. E. | 6 | Tubercular Knee. | Oint. | + | 48 | ++ | neg. | |
| 11. | A. S. | 6 | Tubercular Knee. | Oint. | + | 48 | ++ | neg. | |

TABLE 6.—CASES IN WHICH THERE WERE NO CLINICAL EVIDENCES OF TUBERCULOSIS. OINTMENT.

| Case. | Name. | Age. | Diagnosis. | Reaction. | Pos. + Neg. — | Maximum Reaction Hours. | Degree. | Control. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| 1. | M. P. | 4 | Vaginitis. | Oint. | — | .. | .... | .... | |
| 2. | M. H. | 12 | Vaginitis. | Oint. | — | .. | .... | .... | |
| 3. | E. T. | 10 | Vaginitis. | Oint. | — | .. | .... | .... | |
| 4. | L. T. | 7 | Vaginitis. | Oint. | + | 48 | ++ | neg. | |
| 5. | E. B. | 9 | Vaginitis. | Oint. | — | .. | .... | .... | |
| 6. | G. T. | 7 | Vaginitis. | Oint. | — | .. | .... | .... | |
| 7. | A. B. | 10 | Vaginitis. | Oint. | — | .. | .... | .... | |
| 8. | M. G. | 8 | Vaginitis. | Oint. | — | .. | .... | .... | |
| 9. | L. K. | 1 | Vaginitis. | Oint. | — | .. | .... | .... | |
| 10. | L. B. | 3 | Vaginitis. | Oint. | — | .. | .... | .... | |
| 11. | E. M. | 10 | Vaginitis. | Oint. | — | .. | .... | .... | |
| 12. | F. M. | 1 | Mastoiditis. | Oint. | — | .. | .... | .... | |
| 13. | H. K. | 2 | Gastroenteritis. | Oint. | — | .. | .... | .... | |
| 14. | G. S. | 3 | Dislocated Hip. | Oint. | — | .. | .... | .... | |
| 15. | R. S. | ½ | Gastroenteritis. | Oint. | — | .. | .... | .... | |
| 16. | B. M. | 6 | Congenital Syphilis. | Oint. | — | .. | .... | .... | |
| 17. | M. C. | 9 | Suppurative Arthritis, Knee. | Oint. | — | .. | .... | .... | |
| 18. | J. M. | 7 | Genu Varum. | Oint. | — | .. | .... | .... | |
| 19. | E. T. | 12 | Scabies. | Oint. | — | .. | .... | .... | |
| 20. | B. M. | 2 | Feeder. | Oint. | — | .. | .... | .... | |
| 21. | S. T. | 3 | Otitis Media. | Oint. | — | .. | .... | .... | |
| 22. | E. R. | 2 | Otitis Media. | Oint. | — | .. | .... | .... | |
| 23. | T. M. | | Fractured Leg. | Oint. | — | .. | .... | .... | |
| 24. | M. H. | 1¼ | Pneumonia, Lobular. | Oint. | — | .. | .... | .... | |
| 25. | C. P. | 13mo. | Pneumonia, Lobular. | Oint. | — | .. | .... | .... | |
| 26. | C. M. | 2 | Pneumonia, Lobular. | Oint. | — | .. | .... | .... | |
| 27. | J. C. | 11 | Pneumonia, Lobular. | Oint. | — | .. | .... | .... | |
| 28. | T. VanW. | 3 | Pneumonia, Lobular. | Oint. | — | .. | .... | .... | |
| 29. | L. VanW. | 1¼ | Pneumonia, Lobular. | Oint. | — | .. | .... | .... | |
| 30. | D. VanW. | ¼ | Pneumonia, Lobular. | Oint. | — | .. | .... | .... | |
| 31. | C. W. | 2 | Pneumonia, R. U. | Oint. | — | .. | .... | .... | |
| 32. | C. O. | 10 | Aortic Insuffic. | Oint. | + | 12 | ++ | neg. | |
| 33. | F. S. | 12 | Epidemic Cerebrospinal Meningitis. | Oint. | — | .. | .... | .... | Applied 24 hours before death. |
| 34. | F. J. | 11 | Epidemic Cerebrospinal Meningitis. | Oint. | — | .. | .... | .... | Applied 2 days before death. |
| 35. | H. L. | 8 | Cleft Palate. | Oint. | — | .. | .... | .... | |
| 36. | R. C. | 12 | Psoriasis. | Oint. | — | .. | .... | .... | |

TABLE 7.—CASES IN WHICH THERE WERE CLINICAL EVIDENCES OF TUBERCULOSIS. SCARIFICATION AND DERMO.

| Case. | Name. | Age. | Diagnosis. | Test. | Pos.+ Neg.— | Maximum Reaction Hours. | Degree. | Control. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| 1. | J. K. | 6 | Suspect. | Scar. | + | 24 | +++ | neg. | Dispensary. |
| | | | | Dermo. | + | 24 | ++ | neg. | Father tubercular. |
| 2. | C. K. | 4 | Suspect. | Scar. | + | 24 | ++ | neg. | Father tubercular. |
| | | | | Dermo. | + | 24 | + | neg. | |
| 3. | B. D. | 8 | Suspect. | Scar. | — | .. | ..... | .... | Mother tubercular. |
| | | | | Dermo. | — | .. | ..... | .... | |
| 4. | D. P. | 1½ | Suspect. | Scar. | — | .. | ..... | .... | Father tubercular. |
| | | | | Dermo. | — | .. | ..... | .... | |
| 5. | C. P. | 4 | Suspect. | Scar. | — | .. | ..... | .... | Father tubercular. |
| | | | | Dermo. | — | .. | ..... | .... | |

TABLE 7. (CONTINUED)—CASES IN WHICH THERE WERE CLINICAL EVIDENCES OF TUBERCULOSIS. SCARIFICATION AND DERMO.

| Case. | Name. | Age. | Diagnosis. | Test. | Pos.+ Neg.— | Maximum Reaction Hours. | Degree. | Control. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| 6. | E. G. | 8 | Suspect. | Scar. | — | .. | ..... | .... | Family negative. |
| | | | | Dermo. | — | .. | ..... | .... | |
| 7. | H. F. | 13 | Suspect. | Scar. | + | 48 | ++ | neg. | Family negative. |
| | | | | Dermo. | + | 48 | ++ | neg. | |
| 8. | E. G. | 8 | Suspect. | Scar. | — | .. | ..... | .... | Mother tubercular. |
| | | | | Dermo. | — | .. | ..... | .... | |
| 9. | R. T. | 3 | Suspect. | Scar. | — | .. | ..... | .... | Family negative. |
| | | | | Dermo. | — | .. | ..... | .... | |
| 10. | H. K. | 8 | Suspect. | Scar. | — | .. | ..... | .... | Mother tubercular. |
| | | | | Dermo. | — | .. | ..... | .... | |
| 11. | W. K. | 3 | Suspect. | Scar. | — | .. | ..... | .... | Mother tubercular. |
| | | | | Dermo. | — | .. | ..... | .... | |
| 12. | M. K. | 11mo. | Suspect. | Scar. | + | 24 | +++ | neg. | Mother tubercular. |
| | | | | Dermo. | + | 24 | ++ | neg. | |
| 13. | J. G. | 11 | Suspect. | Scar. | — | .. | ..... | .... | Mother tubercular. |
| | | | | Dermo. | — | .. | ..... | .... | |
| 14. | B. K. | 11 | Suspect. | Scar. | + | 24 | +++ | neg. | Brother tubercular. |
| | | | | Dermo. | + | 24 | +++ | neg. | |

TABLE 8.—DETRE DIFFERENTIAL TEST.

| Case. | Name. | Age. | Diagnosis. | Test. | | Pos.+ Neg.— | Maximum Reaction Hours. | Degree. | Control. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. | N. K. | 3 | Tubercular Cervical Adenitis, left. | Differ. | T. O. | + | 24 | +++ | neg. | Diag. confirmed by operation. |
| | | | | | B. F. | + | 36 | ++ | neg. | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | + | 24 | +++ | neg. | |
| 2. | C. M. | 4 | Tubercular Meningitis. | Differ. | T. O. | — | .. | ..... | .... | Test applied a few hours before death. |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | neg. | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 3. | M. K. | 7 | Tubercular Osteomyelitis, left tibia. | Differ. | T. O. | + | 24 | ++ | neg. | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | neg. | |
| | | | | Dermo. | T. O. | + | 24 | + | neg. | |
| 4. | M. E. | 19 | Tubercular Meningitis. | Differ. | T. O. | — | .. | ..... | .... | Test applied a few hours before death. |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 5. | S. A. | 21 | Tubercular Pleurisy; Tubercular Peritonitis. | Differ. | T. O. | + | 36 | +++ | neg. | |
| | | | | | B. F. | + | 36 | ++ | neg. | |
| | | | | | Bovine | — | .. | ..... | neg. | |
| | | | | Dermo. | T. O. | + | 36 | ++ | neg. | |
| 6. | J. G. | 24 | Tubercular Peritonitis. | Differ. | T. O. | — | .. | ..... | .... | Anæmic. |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 7. | F. S. | 30 | Tubercular Knee, left. | Differ. | T. O. | + | 24 | + | neg. | |
| | | | | | B. F. | + | 24 | ++ | neg. | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | + | 24 | + | neg. | |
| 8. | H. K. | 22 | Tubercular Ankle, right; Abscess of Chest. | Differ. | T. O. | + | 24 | ++ | neg. | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 9. | R. M. | 29 | Tuberculosis of Spine. | Differ. | T. O. | + | 24 | ++ | neg. | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 10. | A. W. | 32 | Tuberculosis of Spine. | Differ. | T. O. | + | 48 | ++ | neg. | |
| | | | | | B. F. | + | 48 | + | neg. | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 11. | H. F. | 21 | Tubercular Hip. | Differ. | T. O. | — | .. | ..... | .... | Bismuth paste treatment, with poisoning. |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 12. | T. S. | 22 | Pul. Phthisis; Pyopneumothorax. | Differ. | T. O. | — | .. | ..... | .... | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 13. | S. J. | 26 | Miliary Tuberculosis. | Differ. | T. O | + | 30 | ++ | neg. | |
| | | | | | B. F. | + | 30 | + | neg. | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 14. | A. R. | 20 | Tubercular Adenitis, Cervical Maxiliary. | Differ. | T. O. | + | 24 | ++ | neg. | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |

TABLE 8. (CONTINUED)—DETRE DIFFERENTIAL TEST.

| Case. | Name. | Age. | Diagnosis. | Test. | | Pos.+ Neg.— | Maximum Reaction Hours. | Degree. | Control. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| 15. | A. C. | 10 | Tubercular Hip. | Differ. | T. O. | + | 24 | +++ | neg. | Four operations. |
| | | | | | B. F. | — | .. | ..... | .... | Discharging |
| | | | | | Bovine | — | .. | ..... | .... | sinus. |
| | | | | Dermo. | T. O. | + | 48 | ++ | neg. | |
| 16. | F. T. | 6 | Tubercular Hip. | Differ. | T. O. | — | .. | ..... | .... | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 17. | F. W. | 10 | Tubercular Hip. | Differ. | T. O. | + | 48 | + | neg. | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 18. | G. H. | 5 | Tuberculosis of Spine, Cervical. | Differ. | T. O. | + | 24 | +++ | neg. | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | + | 24 | +++ | neg. | |
| | | | | Dermo. | T. O. | + | 24 | ++ | neg. | |
| 19. | H. G. | 6 | Tubercular Knee. | Differ. | T. O. | + | 24 | ++ | neg. | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | + | 24 | + | neg. | |
| 20. | M. T. | 6 | Tuberculosis of Spine. | | Bovine | — | .. | ..... | .... | |
| | | | | Differ. | T. O. | + | 24 | ++ | neg. | |
| | | | | | B. F. | + | 24 | + | neg. | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | | T. O. | + | .. | ++ | neg. | |
| 21. | G. S. | 7 | Tubercular Hip. | Differ. | T. O. | + | 24 | ++ | neg. | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | + | 24 | ++ | neg. | |
| 22. | F. V. | 7 | Tubercular Hip. | Differ. | T. O. | + | 24 | ++ | neg. | Discharging sinus. |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | + | 24 | + | neg. | |
| 23. | S. M. | 26 | Tubercular Adenitis, Cervical. | Differ. | T. O. | — | .. | ..... | .... | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 24. | F. J. | 18 | Tubercular Cervical Adenitis, left. | Differ. | T. O. | + | 24 | +++ | neg. | |
| | | | | | B. F. | + | 24 | + | neg. | |
| | | | | | Bovine | — | .. | ..... | neg. | |
| | | | | Dermo. | T. O. | + | 24 | +++ | neg. | |
| 25. | H.M.A. | 55 | Tubercular Cervical Adenitis, right; Pul. Phthisis. | Differ. | T. O. | + | 24 | ++ | neg. | Slight |
| | | | | | B. F. | + | 24 | + | neg. | |
| | | | | | Bovine | — | .. | ..... | neg. | |
| | | | | Dermo. | T. O. | + | 24 | ++ | neg. | |
| 26. | J. J. | 27 | Miliary Tuberculosis. | | Bovine | — | .. | ..... | .... | |
| | | | | Differ. | T. O. | — | .. | ..... | .... | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 27. | S. W. | 21 | Tubercular Adenitis, Cervical. | Differ. | T. O. | — | .. | ..... | .... | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 28. | C. R. | 44 | Tubercular Knee. | Differ. | T. O. | + | 28 | ++ | neg. | |
| | | | | | B. F. | + | 28 | + | neg. | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | + | 26 | ++ | neg. | |
| 29. | A. K. | 22 | Tubercular Hip. | Differ. | T. O. | + | 26 | + | neg. | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 30. | T. P. | 30 | Sacro-Iliac Tuberculosis. | Differ. | T. O. | + | 30 | + | neg. | Slight. |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | + | 30 | + | neg. | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 31. | D. C. | 30 | Tubercular Hip. | Differ. | T. O. | + | 48 | + | neg. | Slight. |
| | | | | | B. F. | + | 48 | + | neg. | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 32. | O. F. | 28 | Tubercular Spine. | Differ. | T. O. | + | 24 | +++ | neg. | Slight. |
| | | | | | B. F. | + | 24 | + | neg. | |
| | | | | | Bovine | + | 24 | ++ | neg. | |
| | | | | Dermo. | T. O. | + | .. | + | neg. | |
| 33. | J. S. | 17 | Tubercular Hip. | Differ. | T. O. | + | 30 | + | neg. | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 34. | S. B. | 22 | Tubercular Peritonitis. | Differ. | T. O. | + | 24 | +++ | neg. | |
| | | | | | B. F. | + | 24 | ++ | neg. | |
| | | | | | Bovine | + | 24 | ++ | neg. | |
| | | | | Dermo. | T. O. | + | 24 | ++ | neg. | |

TABLE 8. (CONTINUED)—DETRE DIFFERENTIAL TEST.

| Case. | Name. | Age. | Diagnosis. | Test. | | Pos.+ Neg.— | Maximum Reaction Hours. | Degree. | Control. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| 35. | O. S. | 34 | Empyema. | Differ. | T. O. | + | 48 | ++ | neg. | Slight. |
| | | | | | B. F. | + | 48 | + | neg. | |
| | | | | | Bovine | + | 48 | + | neg. | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 36. | S. M. | 24 | Tubercular Peritonitis. | Differ. | T. O. | — | .. | ..... | .... | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 37. | S. S. | 26 | Tubercular Peritonitis. | Differ. | T. O. | — | .. | ..... | .... | |
| | | | | | B. F. | + | 24 | + | neg. | |
| | | | | | Bovine | + | 48 | +++ | neg. | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 38. | J. D. | 12 | Tubercular Adenitis, Cervical. | Differ. | T. O. | + | 24 | + | neg. | |
| | | | | | B. F. | + | 24 | ++ | neg. | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 39. | O. D. | 30 | Pulmonary Phthisis. | Differ. | T. O. | — | .. | ..... | .... | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 40. | F. A. | 2 | Tubercular Adenitis, Cervical. | Differ. | T. O. | + | 24 | + | neg. | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 41. | J. S. | 2 | Tubercular Spine, Thoracic. | Differ. | T. O. | + | 24 | ++ | neg. | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | + | 24 | ++ | neg. | |
| 42. | F. W. | 49 | Fistula in ano. | Differ. | T. O. | — | .. | ..... | .... | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 43. | A. K. | 6 | Tubercular Adenitis, Cervical. | Differ. | T. O. | + | 24 | +++ | neg. | |
| | | | | | B. F. | + | 24 | ++ | neg. | |
| | | | | | Bovine | + | 24 | + | neg. | |
| | | | | Dermo. | T. O. | + | 24 | +++ | neg. | |
| 44. | J. G. | 4 | Tubercular Spine, Cervical. | Differ. | T. O. | + | 24 | +++ | neg. | |
| | | | | | B. F. | + | 24 | ++ | neg. | |
| | | | | | Bovine | + | 24 | + | neg. | |
| | | | | Dermo. | T. O. | + | 24 | ++ | neg. | |
| 45. | P. C. | 26 | Tubercular Adenitis, Cervical. | Differ. | T. O. | — | .. | ..... | .... | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 46. | B. D. | 4½ mo. | Feeder. | Differ. | T. O. | — | .. | ..... | .... | Poorly nourished. |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 47. | J. W. | 1mo. | Feeder. | Differ. | T. O. | — | .. | ..... | .... | Poorly nourished. |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 48. | W. K. | 1 | Feeder. | Differ. | T. O. | — | .. | ..... | .... | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | Poorly nourished. |
| 49. | R. S. | 10mo. | Feeder. | Differ. | T. O. | — | .. | ..... | .... | |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Dermo. | T. O. | — | .. | ..... | .... | |
| 50. | N. M. | 1mo. | Feeder. | Differ. | T. O. | — | .. | ..... | .... | Poorly nourished. |
| | | | | | B. F. | — | .. | ..... | .... | |
| | | | | | Bovine | — | .. | ..... | .... | |
| | | | | Differ. | T. O. | — | .. | ..... | .... | |

evident. A negative test in the adult, all circumstances considered, is more valuable than a positive one. The non-value of the scarification in the adult has been pointed out by von Pirquet,[17] von Emmerich[18] and Hamburger.[19]

5. The type of the reaction bears no relation to the type of the disease. It is true, however, that the slowly developing, mild reactions

17. Jour. Amer. Med. Assoc., February, 1909.
18. Munch. med. Wochenschrift, 1908.
19. Wiener klin. Wochenschrift, 1908.

occurred in the apparently arrested, cured or old cases. The most active reactions took place in the surgical forms of tuberculosis.

Concerning the Detre, the number of cases examined is not sufficient for conclusions, but it would appear that much information is to be obtained by such a test. The frequency of the old tuberculin producing the dominant reaction would indicate that, therapeutically, one of the filtrates, or a combination, should be employed.

It is a great pleasure to express publicly my appreciation and thanks to my associates, especially Drs. Lewison and Crede of the Dispensary and Drs. Meigs, Scott and Seippel of the County Hospital, for their most valuable assistance.

103 State Street.

DISCUSSION ON THE PAPERS OF DRS. BUTTERFIELD AND TICE.

Dr. S. E. Munson, of Springfield:—Mr. President: Nine years ago I read a paper before this society in regard to bovine tuberculosis as affecting the milk supply. At that time there was scarcely any evidence to show that bovine tuberculosis was transmissible to the human being. After reading that paper I had some correspondence with men of wide experience and observation, at that time saying that they did not believe that bovine tuberculosis was transmissible to the human being. At that time there were a great many who believed it was transmissible to the human being, and I am glad to-day that the prevailing opinion among those who have had opportunities of investigation is that it is communicable to man.

I think the source of our milk supply in each community rests largely upon the physicians, and it is certainly of great importance to the medical profession in their work and in the care of their families that they know something about the milk supply children are fed upon. We physicians at Springfield have had a good deal of difficulty of that kind. Some years ago we had a dairy started there by a man of comfortable means, and the milk he has furnished us has been the best thus far we have been able to obtain. At the present time, there is good evidence that he is no longer holding up the high standard of his milk as formerly, and probably at times, when his milk supply is scant in the winter season, he has bought milk from other dairies. At Springfield we have no examination of the dairy herds that supply the milk to our city, and cities of like size have the same difficulty. The milk is shipped in from the surrounding country without there being any milk inspection. The only source of milk inspection we have is a city chemist, a recent adjunct to our municipal administration, and there is no test made other than that the dairyman has a certain percentage of fat in his milk. There is no examination of the ice cream that is made from these various supplies of milk sold in our city. I suppose the same condition prevails elsewhere. I contend that with a city of our size a man should not be able to market his milk until there is inspection of his dairy, and nine or ten years ago, at the time I read my paper, there was a state law whereby the State Veterinary was empowered to go out and slaughter tuberculous animals; but that law was repealed on account of the outcry of the farmers. There has been some recent legislation enacted, and I hope gradually the cows from which the milk supply is obtained for our cities will undergo this inspection or tuberculin test again. I think physicians scarcely realize the number of children and infants infected through milk, and inasmuch as we know there is no better food for the infant, or in caring for children, than milk, it behooves us to look to the source from which we obtain our milk.

Dr. E. Fletcher Ingals, of Chicago:—I want especially to commend the paper of Dr. Tice, and I hope the members of the society will read it carefully when it is published, because it was concise, and there was much in it that might be overlooked.

Remembering that practically every adult has tuberculosis, it is very important that we should be able to make our diagnosis of active tuberculosis as soon as possible. It seems to me the statements of the author of the paper were complete and conclusive, that these cutaneous tests are of value in determining whether or not the case is active. Perhaps we can not prove that, but taken in connection with the other means of making a diagnosis, it is of much value. This ought to be taken in connection with what was said by Dr. Butterfield in his paper, who suggested that the tuberculin treatment should not be used indiscriminately. I have known practitioners who would make the cutaneous or other test, and if they found tuberculosis present they would begin with the tuberculin treatment at once. That is a most pernicious practice, and I hope these papers will be carefully considered by the members, so that practitioners will not run wild on this treatment.

Dr. W. C. Bouton, of Waukegan:—Personally, I have had very little experience with the treatment of tuberculosis by tuberculin, but my office partner, Dr. Watterson, has had a good deal of experience with the disease and the Moro test. He developed tuberculosis himself five years ago, went to Colorado and after about a year all symptoms of the disease disappeared. He returned to practice in Waukegan last spring, started a tent colony, has had quite a number of patients and has obtained good results. He has used the Moro test in every case and I think, with possibly one or two exceptions, he has obtained a positive result in all patients who showed any symptoms of tuberculosis from the physical examination. Some patients came to him in whom there was a suspicion of tuberculosis, as they were a little anemic or run down, but in whom there were no physical signs elicited and there was no result from the Moro test. The Moro test will also give results in arrested cases, because the Doctor has tried it successfully on himself and he has not had a symptom for over two years. He has examined his sputum repeatedly for tubercle bacilli, but has been unable to find any. He has been in perfect health the last two years but gets a positive result from the Moro test. He had a patient come to him a few weeks ago with a temperature. He tried the Moro test, which was negative. He found that the patient was running an afternoon temperature. The man had not been feeling well and he believed the man was developing typhoid. He tried the Widal test, but it was negative. However, by watching the patient carefully and examining the sputum a couple of weeks ago, this examination revealed tubercle bacilli and at the same time the Doctor got a positive result by the Moro test.

Mr. Butterfield (closing the discussion on his part):—I want to emphasize the point of increase in weight, with general improvement, which was much more striking in the group of the first series of twenty-three, as compared with the latter group, in which no tuberculin was used. The results are so striking that we could not help but compare them.

In connection with the use of Koch's B. E., I would state that in making a diagnosis we start in with one-tenth of a milligram, increasing by one-fifth of a milligram every third day until one milligram is reached, then increasing from one to two or three milligrams.

It is hardly necessary to use higher doses because a reaction is usually obtained in positive cases with the smaller doses.

Dr. Tice (closing the discussion):—I would like to say a few words in regard to Dr. Butterfield's paper, although the discussion has been closed. It is only recently that any attention has been paid to the differential diagnosis between the bovine and human type of infection. It has been quite the custom in the treatment of tuberculosis to use the old form of tuberculin in all forms of the disease. Unquestionably, this must be held accountable for so many failures, and through the recent efforts that are being made we probably will have a brighter future in the treatment of tuberculosis with tuberculin. It was observed by the experiments of Romberg and others that human tuberculosis, due to the type of human bacillus, was practically impossible in some of the lower animals, particularly in the cow. On this assumption, Spengler, of Germany, conceived the idea of attempting to make a clinical diagnosis of the type of in-

fection present, and administer the appropriate form of tuberculin. In doing this he has subdivided his cases into those where the bacillus can be easily obtained, either from the sputum, a discharging sinus, from the feces, the blood, or by aspiration; and, second, into those cases where tuberculosis is hidden. It is in the second type that the diagnosis is attended with difficulty. His attempt to make a differential diagnosis consisted in the subcutaneous use of various forms of tuberculin. For instance, he uses the filtrate of the human type of bacillus, and if the case reacts quite actively or violently, it is an index of the existence of the human type of the disease. On the other hand, if the bovine gives a more active reaction, then the bovine type of infection is present. When this occurs, he uses the opposite form of tuberculin. If the bovine acts violently he uses the human type, for the reason that there seems to be an antagonism between the two types of the infection. It is not only consistent to use tuberculin of the bovine type in a bovine infection, but it is now suggested by Spengler, of Germany, by Raw, of England, and Pottenger, of our own country, that much better results can be obtained by the use of the bovine tuberculin in the human type of the infection. This may seem startling. First of all, it is opposed to the teaching of immunity. Second, we would hardly expect the employment of a different form of tuberculin to produce as good an effect as the appropriate tuberculin, but, nevertheless, a grain of experience is better than a ton of theory, and conditions certainly justify this theory. So at the present time there is a strong tendency to use the bovine form of tuberculin in the human type of infection, as has been emphasized in the results of the test by Detre, which is only another attempt to determine the form of infection and the appropriate tuberculin to use in the treatment. Pottenger, in making his diagnosis, if he uses too large a dose of the bovine form of tuberculin and gets a violent reaction, will usually administer the old tuberculin or the filtrate of the human type, and at once the temperature falls, and all of the untoward symptoms and signs are immediately neutralized.

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## THE SERUM TREATMENT OF EPIDEMIC CEREBROSPINAL MENINGITIS.*

FRANK SPOONER CHURCHILL, M.D.

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The bacteriology of meningitis is most varied and cases may be divided into two groups, the tubercular and the non-tubercular. The tubercular cases are due to invasion of the meninges by the bacillus of tuberculosis, the non-tubercular to invasion by a great variety of organisms. The great majority of the latter group consists of cases due to the diplococcus intracellularis of Weichselbaum, 80 per cent. of non-tubercular cases being due to this organism. It is familiarly known as epidemic meningitis. For the treatment of this particular form of meningitis we have now had for about two years a specific serum evolved by Simon Flexner. It is with this type of meningitis, and this alone, that the Flexner serum is effective. It is useless in all other forms. This statement seems necessary in view of the requests which have been made of me to use the serum in tubercular meningitis, in non-tubercular meningitis due to the pneumococcus, to the streptococcus—e. g., in head injuries and in meningitis occurring in the course of the various infectious diseases and of the intestinal infections. The specific nature of

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the serum must be borne distinctly in mind. It will do no more good in a pneumococcic or streptococcic meningitis than will diphtheria antitoxin in a pneumococcic or streptococcic tonsillitis.

The development of the serum is interesting. Flexner, studying the New York epidemic of meningitis in 1894, sought to influence favorably the course of the disease produced experimentally in animals by antisera prepared in several kinds of animals from diplococcus intracellularis. His first reports showed that the course of the disease in guinea-pigs and monkeys could be modified favorably and animals saved from the fatal effects of the diplococcus.

Subsequently Flexner and Jobling developed a diplococcus antiserum prepared from the horse, which now has been used for about two years in the treatment of epidemic meningitis in man. They have collected up to date about 500 cases, and the results in these cases justify the opinion expressed by them in an earlier publication that "it is our belief that the analyses of histories of cases of epidemic meningitis which have been presented furnish convincing proof that the antimeningitic serum, when used by the subdural method of injection in suitable doses and at proper intervals, is capable of reducing the period of illness, of preventing, in large measure, the chronic lesions and types of the infection, of bringing about complete restoration to health in all but a small number of cases of the recovered, thus lessening the serious, deforming and permanent consequences of meningitis, and of greatly diminishing the fatalities of the disease." Their cases, taken as a whole, show a mortality of 25 per cent.; in a few series of cases, where treatment was begun within the first three or four days, the mortality was 11 per cent. Furthermore, among the 75 per cent. of recoveries, there were few of the serious sequelæ generally noticed after this infection. Hitherto the mortality in epidemic meningitis has ranged from 75 per cent. to 80 per cent., and among those living the persistence of serious sequelæ has been so great that the survival of the patient has been considered unfortunate. In other words, treatment of this infection by the Flexner serum has reversed the proportion of deaths and recoveries.

I have had the opportunity of watching the effect of the serum upon 41 cases of meningitis, 29 of which have been proved to be of the meningococcic type. Of these 29 proven cases, 16 have recovered, 13 have died—a mortality of 44 per cent. Closer analysis of the series shows that of 16 cases receiving the serum within the first week 6, or 37 per cent., died; of these six 3 were fulminating cases and died within the first two days, the fourth was a bartender, aged 43, and the other two were not closely followed up but received each only one dose of the serum.

This series of cases represents only one of many series, reports from all of which are sent, from time to time, to Flexner for analysis by him. His figures, therefore, are a better average test of the serum than are my smaller ones. It will be noted that the average mortality in my series is much higher than in the grand total of all series. I attribute this higher mortality in my series to the fact that many of the patients were treated in their own homes, at widely separated points, in

three different states; hence the difficulty of closely following them and giving repeated doses of the serum. On the other hand, those cases treated directly under my eye, in hospital, as a rule have done better than those treated at home. It is the latter group which have raised the mortality rate. I have, therefore, come to the conclusion that it is extremely desirable to send cases of meningitis to the hospital; they can be watched more closely, the serum can be given more persistently and thoroughly; furthermore, more exhaustive and extensive laboratory investigations, as to blood, spinal fluid, etc., can be carried out; the advisability of these investigations is especially great in these early days of the serum, when more accurate knowledge as to its exact action is desired.

The effect of the serum upon the general course of the disease and upon the spinal fluid is interesting. Even after the first dose the general well-being of the patient is improved, the temperature abates, not infrequently dropping suddenly, termination by "crisis," the mentality clears and the whole clinical picture undergoes the most astonishing change. The number of leucocytes in the spinal fluid diminishes, the diplococci, at first abundantly numerous outside the cells, become "phacocyted," and at the second or third puncture are seen to be much more numerous within the leucocytes and finally disappear altogether.

It is not the object of this paper, however, to describe in detail these phenomena; rather, I wish to dwell upon the importance of early diagnosis and to emphasize certain points in the administration of the serum. Early and exact diagnosis is vital. To accomplish this lumbar puncture is necessary. We may all recognize a meningitis clinically; it is impossible to determine its type during life without bacteriologic examination of the spinal fluid—i. e., without lumbar puncture. This, then, is the first point. Furthermore, it has been shown that patients coming early under treatment have a much better chance of recovery than those first receiving the serum late in the disease. Hence we must arrive at an exact diagnosis in a case of meningitis as early as possible.

## TECHNIC.

The method of giving the serum is important and I now describe it in detail:

All the active workers with the serum are unanimously of the opinion that in order to get the best results it must be brought closely in contact with the pathological seat of the disease and that this can best be done by a lumbar puncture and injection of the serum into the spinal canal. It is useless to give it subcutaneously. After study of my own cases and those of other observers I have come to the following conclusions as to the method of using the serum:

In all cases which clinically resemble meningitis we must do a lumbar puncture; for this purpose we may use the needle of either a large antitoxin syringe or of a large aspirator, holding at least 30 c.c., the minimum dose to be given. Both patient and apparatus, of course, are to be surgically clean. Have the serum ready for injection. The puncture is to be made according to the usual rules laid down in text-books

—i. e., in the third or fourth lumbar space, close to the spine, this point being determined by the imaginary line running from crest to crest of the ilia. The needle once in the spinal canal, the fluid begins to flow out; rarely is there any obstruction from clogging of the needle; if so, clear it with the obturator. Note the presure of the fluid, if possible, with the sphygmomanometer, or, roughly, by counting the number of drops per minute. Note also its turbidity and color.

Collect a few drops of the fluid on clean glass slides for immediate staining and microscopic examination. Also inoculate several test-tubes of culture media by allowing the fluid to trickle directly over the media; finally collect the remaining fluid in a sterile test-tube for counting the contained leucocytes and centrifuging for further examination. Evacuate in all 30 to 45 c.c. if possible. If it be the least bit cloudy or turbid, inject the serum at once without waiting to learn the result of even the smears, injecting as follows: To the needle still in the spinal canal attach the syringe previously filled with the serum (warmed to about the body temperature). Inject slowly, using only gentle pressure in forcing down the piston; give 30 to 45 c.c., except in small babies, where a smaller amount may be used. Thirty c.c. may be given, even if the amount of spinal fluid removed is less than this. It is desirable, though not necesary, to remove spinal fluid equal in amount to the serum to be given.

### EXAMINATION OF THE SPINAL FLUID.

The spinal fluid should be examined immediately; the glass smears are stained by the Gram method and examined for both cellular elements and organisms; care should be taken to note the relative number of diplococci within and without the leucocytes. Fortunately the smears are fully as reliable as the cultures; hence we do not have to wait long for an exact diagnosis. The cultures should, of course, be incubated and examined later. The total number of leucocytes in the spinal fluid should be counted, by the Thoma-Zeiss apparatus, as soon after evacuation as possible.

### REPETITION OF THE SERUM.

If the bacteriologic examination shows the presence of the diplococcus, subsequent injections should be given. In the earlier days of the serum it was customary to wait, if improvement followed the first injection, until unfavorable symptoms developed—e. g., increased temperature, great restlessness, pain, headache, etc.—and then to give the second dose. Subsequent observations, however, especially by Dunn, have shown that better results are attained by giving the serum daily for three or four successive days, regardless of the clinical and bacteriological progress of the case. The serum can do no harm, and this concentrated method of giving it is undoubtedly better than waiting for symptoms to arise and then hitting them. In severe and fulminating cases the serum should be given in from 12 to 18 hours after the first and 45 c.c. should be given. In several instances this amount of serum has been injected without bad results, even though less than this amount of fluid had been removed.

Having thus given our first series of three or four doses on successive days we may pause and note results; as a rule improvement will be seen, both clinically and bacteriologically, and no further injections will be necessary, at least in patients coming early under treatment. But if, after an interval of a day or two, untoward symptoms still persist, another series of doses should be given daily, perhaps for two days, perhaps for four days, then another pause be observed. This process, of alternate giving and withholding of injections, may be continued until either symptoms have ceased or bacteria have entirely disappeared from the spinal fluid or the chronic stage has been established. As a rule it will be found that the diplococci disappear comparatively early and that we may then cease our injections. If the serum is to be effective, it will be so early in the disease, after a few doses. If, however, the organisms persist in the spinal fluid for a long time, occasional doses should be given. In all cases, whether those recovering completely or those running on into the chronic stage, lumbar puncture should be done from time to time until no organisms are found, either in smears or cultures. We must leave our patient with a sterile spinal fluid.

Relapse should be treated as fresh cases. Certain complications, if due directly to the meningococcus, may be an indication for the local use of the serum. Thus in one of my series, a severe arthritis of the knee, proved by bacteriological examination of the aspirated fluid to be due to the meningococcus, received two doses of 15 c.c. each, given directly into the joint, with immediate relief to the pain and apparently permanent improvement. Cushing has reported a similar case.

I am much indebted to the various physicians who have given me the privilege of studying their cases of meningitis.

## SUMMARY.

The main points in this paper may be briefly summarized as follows:

1. In all cases clinically suggesting meningitis do a lumbar puncture as early as possible.

2. If the fluid thus obtained be turbid, immediately inject at least 30 c.c. of Flexner serum directly into the spinal canal, without waiting to hear the bacteriological report of the fluid.

3. Examine the spinal fluid bacteriologically. Smears are more important than cultures. If diplococcus intracellularis be found, repeat the injections daily for the three or four following days; in severe cases give the second dose 12 hours after the first.

4. After the first series of doses, wait two or three days, and, if necessary, repeat the series.

5. The serum is a specific and of value in meningococcic meningitis only.

6. It is useless to give the serum subcutaneously.

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## DISCUSSION ON THE PAPER OF DR. CHURCHILL.

Dr. S. E. Munson, of Springfield:—Mr. President: Through the courtesy of Dr. Churchill I had the privilege of using Flexner's serum in two or three cases of spinal meningitis. One of these cases was moribund at the time the serum

was injected, and died within an hour or two afterwards. I speak of this as being a case of cerebrospinal meningitis, owing to the character of the spinal fluid and the differential cell count, particularly as to turbidity, and so forth.

The second case I saw with another physician who had called me to administer the serum. It was clearly evident from the history that this was a case of tubercular meningitis, and upon spinal puncture the spinal fluid was found to be perfectly clean. After the fluid stood for twelve hours a fine coagulum, as described, was found in the fluid. Upon removing the coagulum and staining tubercle bacilli were found to be very numerous.

The third case was unmistakably one of cerebrospinal meningitis, which I reported to Dr. Churchill. This case received the serum at about 3 o'clock in the afternoon of the fifth day of the disease, and at about 12 o'clock at night the temperature became normal, with profuse sweating, and after that time there was no rise of temperature. This patient gradually improved and in about six weeks returned to school again, recovered. I can assure you it was a very severe type of fulminating cerebrospinal meningitis.

There is much improvement in regard to the examination of the spinal fluid, and that particularly as to its character. As stated by Dr. Churchill, we should not wait for a microscopical examination before using the serum if the fluid is turbid. If there is any turbidity of the fluid, it is good evidence that the case is not tubercular. In my case of tubercular meningitis the spinal fluid was absolutely clear and the coagulum well formed. The examination and staining of the coagulum for tubercle bacilli will, of course, make the diagnosis clear. The differential cell count is of great importance. In the cerebrospinal or epidemic variety of disease the polymorphonuclears largely predominate, ranging from sixty to eighty per cent. In the tubercular variety the mononuclears predominate to the same per cent. This is also important, and, as the essayist suggested, examination and staining of the fluid immediately after it is withdrawn from the spinal canal are of much greater importance than examination after twelve to twenty-four hours. In fact, if the spinal fluid is placed in an ice-chest and allowed to remain there over night, you would not be able to obtain a culture of the diplococcus under any circumstances, as they are often difficult to find. Furthermore, it is of great importance to administer the serum subdurally or intraspinally, because it is the concensus of opinion that subcutaneous injection of the serum is of no importance. The serum, instead of being antitoxic, as the other serums, has not been found to be so to any great extent by demonstration, but bacteriolytic, that is, when coming in direct contact with the diplococci, they are destroyed. That is a good point to remember also.

Dr. Frank Billings, of Chicago:—This excellent paper should not go by without more discussion from the standpoint of experience. In quite a number of Dr. Churchill's series are the cases which we have treated at the Presbyterian Hospital. Anyone who has seen cerebrospinal meningitis treated under the old methods by drugs or hygienic measures alone will be struck with the specificity of this treatment when they have had some experience with it. I want to relate two cases to show how quickly it manifests itself.

A little over a year ago we had a Greek between twenty and thirty years of age brought in from South Chicago. He was so nearly unconscious that he did not recognize anything. He was unable to speak English, but manifested pain by placing his hand at his head. His muscles were all rigid. There was opisthotonos. It looked like meningitis. Spinal puncture was made, and a drop of the fluid obtained, which showed the meningococcus. We happened to have serum and immediately injected it. Within twelve hours of that time the fellow sat up in bed. He knew that something was applied to his back. He indicated by motions that pain was gone. His muscles were less rigid, and he patted his back, indicating that he wanted some more. He had subsequent injections and made a steady recovery.

We have a patient now under treatment, and I suppose Dr. Churchill has included it in his series of cases.

Dr. Churchill: No, it is not included.

Dr. Billings: This patient was a boy, another Greek, twenty-six years of age, and was brought into the hospital on a Monday. Twenty-six hours preceding his admission he was taken with headache. When admitted he was semi-conscious. His muscles were rigid, his head retracted, his belly scaphoid, and the right external rectus was paralyzed. Immediately, spinal puncture was made, and some fluid obtained. We had none of the serum in the hospital at the time, but the diagnosis was made from the spinal fluid. There was one depot at the Michael Reese Hospital, to which my interne went at once and secured some serum. The same night 30 c.c. were injected. His symptoms were not much relieved by Tuesday morning. A second spinal puncture was made near the first injection, and over 30 c.c. of spinal fluid was withdrawn. The next day again about 40 c.c. was withdrawn from the spinal canal, and 45 c.c. of serum injected. By this time the boy showed greater improvement. By Wednesday the paralysis of the right external rectus had diminished very much. He was conscious, talked in broken English, and expressed himself as feeling better, but still had some headache and stiffness of the muscles of the neck especially. Since that time he had injections every day for five days up to Saturday, when he had his last injection. Yesterday morning his temperature was 99°; his pulse was below 90; his respirations were normal. He still showed rigidity of the neck muscles, and some of the erector spinæ muscles were stiff, and his Kernig sign was still present. Other than that the boy seems very much better. And the remarkable thing was the effect upon his leucocytes in the blood and in the spinal canal. Dr. Churchill spoke of the leucocytes in the spinal canal. When the boy came in, his white blood count was 23,000; after the first injection it fell two thousand; by the next day it had gone to 32,000, then it fell steadily, and the count day before yesterday was 10,000 leucocytes in his blood per millimeter. The spinal fluid contained 13,000 plus white cells per cubic millimeter when he came in. Yesterday there were 1,000, so you see the infection has diminished, as manifested by the leucocyte reaction in the blood and by the number of leucocytes in the spinal canal. That method of estimating the infectivity of the spinal fluid is a good one. We used it first in the Presbyterian Hospital. This consists in counting the leucocytes in the spinal fluid with the white blood counter, and with each subsequent withdrawal of fluid and count, one may more accurately ascertain just what the condition of the spinal fluid is. Of course, it may clear up and still the patient go on to a fatal ending, because of the implication of the brain with the meninges.

There is one very important point which I would like to mention, namely, just as it is in diphtheria, when antitoxin is given early, so in this disease the serum must be given early, when its specific and curative effect is much more sure than if it is given late. The same rule applies here as applies in diphtheria. If this is a specific serum for epidemic cerebrospinal meningitis, then certainly it will do no good in any other bacterial form of meningitis. It will do no good in the tubercular form, the pneumococcic form, or any other form, but this one. Therefore, before going on to multiple injections into the spinal canal, one must prove by bacteriologic examination of the spinal fluid that he has this particular form of meningitis to deal with, otherwise it would be wasteful and unnecessary to hold out to the friends.

Dr. John M. Dodson, of Chicago:—There are one or two statements which Dr. Churchill makes about which I should not be inclined to be so positive, and I should go a little further than Dr. Billings has done as to the advisability of injecting the Flexner serum only after a diagnosis has been made. It should take but a few minutes, an hour or two at most, to ascertain whether the cerebrospinal fluid contains diplococci or not. One ought not to take cases of this sort without being prepared to make such examinations, and, as Dr. Churchill has well said, it is unnecessary to wait for a culture, cover-slip preparations being quite as reliable. There does not seem to me to be the same urgency in the matter of minutes in the administration of this serum that obtains in a case of diphtheria. Rarely does one see a case of this sort until the second or third day, and usually not until the end of four or five days, and the waiting of an hour or two

to inject the first dose of serum is not material. It is not like diphtheria, where one must wait often twelve or twenty-four hours to establish the diagnosis by culture methods. I believe we shall do better in the present status of serum-therapy, in view of the results already secured, if we establish the diagnosis before we make the injection. I am not certain that this serum is absolutely unattended with unpleasant results. Already in these cases of Dr. Billings', after one ordinary injection of the serum, a skin eruption was seen. There is a reaction. In one case seen in my wards last autumn one of my assistants made an injection of the Flexner serum in a case of tubercular meningitis. There was a distinct intensification of the symptoms after that injection. I think Dr. Churchill does not agree with me about that case, but I am very certain about it. It stands to reason that this should sometimes occur. If the mere withdrawal of the fluid under pressure from the spinal canal is attended with great amelioration of the symptoms, the injection of an additional amount of serum, or of fluid of another sort, may intensify the symptoms. If we can avoid the injection, in the case of tubercular or other forms of meningitis, by knowing what we are doing before we make the injection, I think it is better.

Again, I would not be so positive in stating that the injection of the serum anywhere else, except in the spinal canal, is of no advantage. In one case we had a year ago this spring in the hospital, the last injection was made subcutaneously. It seems to me that the history chart and my recollection of the case go to show that the same amelioration of symptoms followed that injection as followed the intraspinal injection. I would not use that as an argument, however, for employing the serum subcutaneously. But the point is this: The diplococcus infection may be a blood infection, and not a meningeal infection at all. Two or three cases of that sort have been reported where the diplococcus intracellularis has been found in the blood, severe symptoms being present, and repeated examinations failed to find it in the spinal canal. If the serum has a direct action by contact with the diplococci, in these cases the logical thing would be to inject the serum intravenously or subcutaneously, and I take it, in such unusual cases, we have a combined intraspinal and systemic infection. The indications in such case would be for a combination of subcutaneous and intraspinal injections, although the latter are much more effective in the ordinary forms of the disease. The operation is far simpler than is usually thought. It is an extremely easy matter to make lumbar puncture. The danger is slight, but I think we ought to move with reasonable conservatism, and where it is possible to make a diagnosis within an hour or so, I feel much better satisfied to know that I am dealing with a *diplococcus* meningitis before using the serum.

Dr. Churchill (closing the discussion):—It was a great temptation to go into an account of the clinical course of the diseases in my paper, but I purposely left it out, on account of the limited time at my disposal.

There are one or two points I would like to speak of; first, the course of the disease is followed by a drop in the general leucocytes in the blood and the leucocytes in the spinal cord, etc. There is a remarkable parallelism, if you compare them, between the drop in the leucocytes of the blood and the drop in the leucocytes in the spinal fluid. There is a drop in the temperature, especially in the cases terminating by crisis. We have a drop in temperature from 104° to normal, accompanied by a fall in the number of leucocytes.

Dr. Munson alluded to the cellular contents of the spinal fluid. The cells undergo a curious sort of change later on. At first, the polynuclear type predominates largely. If the case progresses favorably, future punctures show a diminution in the number of polynuclears, and an increase in the number of mononuclears. Rigidity of the muscles persists in a most curious way, even after general improvement in the condition of the patient takes place. It is a curious sight to go into the Children's Ward, see their heads retracted, still in a condition of opisthotonos, lying there and smiling and playing with their toys.

With regard to what Dr. Dodson said, I can not agree with him. He remarked that lumbar puncture is a very easy procedure. If it is, why not resort to it? In regard to the serum being used subcutaneously, I wish to say that Flexner

and his clinicians insist that it must be given subdurally, and that it is useless to give it subcutaneously; in the case which Dr. Dodson alludes to at the Presbyterian Hospital, and which I had the opportunity of following, through the courtesy of Dr. Dodson, if you will take the chart and study it carefully, it will be evident that while there was some apparent letting-up of the symptoms after the subcutaneous injections, the improvement was not permanent. The temperature went up again shortly afterwards; whereas, when the serum was given in the spinal canal, the improvement was lasting. Another objection to giving the serum subcutaneously is that it becomes too much diluted when administered in that manner, and does not act in such a concentrated way as it does when it is given directly into the spinal canal. It seems to me the evidence is overwhelmingly in favor of giving the serum by way of the spinal canal. The diplococcus has been found in the blood of patients with epidemic meningitis in about 25 per cent. of the cases.

The points I want to emphasize mostly in this paper are: Get hold of these cases just as early as we possibly can, make a positive diagnosis, inject the serum into the spinal cord, repeat it, and don't be afraid of it.

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## RACE BREEDING.

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Rarely is a physician consulted on the vital topic of "how can I raise a good human animal?" When such query is put by the intelligent parent he often makes the surprising discovery that his family adviser is as little prepared to grapple with this problem as he is himself. To supply the practitioner with some useful arguments for such an emergency is the object of the following remarks. They contain nothing new or startling, but are my views, in conformity, I believe, with those competent to speak on this interesting and important subject.

To begin at the primal source of good or bad offspring, we must utter a word of caution in the matter of proper mating: No one should be permitted to marry who is a physical or mental cripple. If the individual can not or will not be persuaded to voluntarily desist from an unfit union, the state must interfere. Laws must not only be passed, but also enforced, which will require a certificate of health before a marriage license is issued. Those unfit to marry because of existing physical or mental infirmities should be informed that they are doing an act of charity to unborn generations by remaining unmarried.

Far from underestimating the greatest of all passions, love, I regard health of prime importance. Think of the disastrous consequences of a union between the tubercular and the epileptic, the neurotic and the insane! Love, though a great blessing in this loveless world of ours, should not be converted into a distributer of the seeds of ruin and decrepitude among the generations who are to follow us. The first thing to be demanded of each of the contracting parties in the business of race-building is a clean bill of health. Next, a family record of freedom from the various hereditary degenerative tendencies, is to be produced. And finally, if temperament and disposition do not stand in the way, little

Cupid may be consulted instead of Bradstreet or Dunn. And now I may be confronted with the apparently just question, "What business does the state have to interfere with my individual private rights?" The answer is that the act of marriage has long been recognized as a state institution. Upon the family rests the entire superstructure of our civilization. Primitive man and, let us not be deceived, even civilized man, is by nature a polygamous animal. The state compels man to restrict himself to monogamy. This is quite necessary, because the state wants every child to know its father, who is to support it during the period of helplessness. If the state has a right to restrict a man to one wife and a woman to one man, in each instance, why not to a healthy one?

I shall endeavor to adduce my reasons for this position, but at this point the questions of heredity and environment need discussion. Throughout the animal kingdom every living being is the offspring of another being, which latter must have come down in an unbroken chain from still other beings. We are here because, first, in numerous generations since man appeared the living matter has been transmitted from parent to offspring in an uninterrupted series, and, second, because we were able to withstand the changing environments with their tendencies to destroy us. For the production of proper offspring, then, two things are essential: First, a good heredity, and, second, a favorable environment. Clearly, then, each must claim our earnest attention.

Heredity: We not only inherit the physical constitution of our forbears but, most particularly, their mental characteristics. The living speck of protoplasm in which human life has its beginning contains the life history of all the generations that preceded it, both on the father's and mother's side. Not only do we inherit a certain type of physical eye, but we also look upon the world through our ancestors' mental vision.

Environment: The product thus transmitted through a long line of ancestors is not fixed or finished. On the contrary, it is plastic and capable of being molded into various shapes. The early stages are merely transitional, and, beginning with the period of formation of the microscopic mass of protoplasm up to the completion of the fully developed "lord of creation," an infinite number of influences are constantly at work molding the product into its final shape. All this has long been understood by cattle raisers who make a study of progeny and stock-breeding with the happiest results, but the human animal rarely applies his science to his own case.

What shall be done with the child to whom its parents have already transmitted an inferior physical or mental constitution? My answer is: By a well directed course of training and education we may overcome many inherent faults. But, unfortunately, the training of the child with poor heredity is commonly left to the very persons who gave it life. Can there be anything more perverse and harmful than to leave the impressionable child with a faulty heredity in an atmosphere, every breath of which exhales instability? Imagine, further, the effect upon a child's brain who is treated daily to the sight of a drunken father, or an immoral mother, or who must be a witness to the petty quarrels and disputes of its excitable parents! Incompatibility among married couples

is not only the cause of a great deal of unhappiness for themselves, but almost invariably tends to create nervous and mental instability in the offspring. And, again, children who are raised by too strict a father and too gentle a mother often acquire a moody, vacillating character. It would be far better to have the children removed from such parents than to allow them to grow up as their miniature copies. The state should have the right to step in and insist upon taking proper care of its future citizens if the parents prove themselves incompetent for this task.

Permit me to mention a few sins of omission and commission in the bringing up of children:

First. I believe the American custom of allowing meat to young children decidedly bad. No child under 5 years should ever receive meat and after that age it should be allowed small quantities only. The principal article of diet in childhood must always remain milk. Coffee, tea, or alcoholics should never be given to children, particularly alcohol, which is a nerve poison at all times and especially in childhood.

Second. Accustom the child's body to variations of temperature. "I am too cold" and "I feel too warm" are expressions of nervousness and require mental discipline. Children must be compelled to take walks in all kinds of weather.

Third. Insist upon exercise, such as turning, baseball and football. But a note of warning must be sounded against encouraging the gambling spirit by permitting the boy to cultivate a liking for races. Many of our race-track gamblers acquired their gambling propensities early in life.

Fourth. Steel the child against pain and discomfort. Bodily and physical pain are usually aggravated by sympathy. Judicious intentional disregard of a child's imaginary complaints is good treatment. Intolerance of noise is an early sign of nervousness. When a child shows the slightest disposition to such intolerance combat it promptly by designing for it noisy games. Normal children seem to enjoy the ear-splitting noise of the play-room and the street and abnormally sensitive ones should be trained to tolerate them.

Fifth. Teach children to control their emotions. Pleasure and pain are relative terms. Many things which are at first unpleasant may by training be made to give us a sense of satisfaction later. We must begin at the table. There should be no dislike for certain foods. The child must eat everything except articles unfit for its age. The emotion of anger should be carefully attended to; particularly the too ready tendency of a youngster to make fists or call names whenever displeased. The child should be refused some things.

Sixth. Teach the child absolute fearlessness. Children should sleep in dark bedrooms and must be trained to brave thunder and lightning. Do not fill their little brains with ghost stories, nor teach them the horrors of hell. It is well not to give them religious instruction until they are old enough to understand its significance.

Seventh. "Little folks" should not accompany their parents on their annual travels and long vacations. Their small and undeveloped brains are not ready to assimilate the many new impressions. Besides, they

become supersaturated with pleasure and will have nothing more to anticipate. Why not leave something for the future?

Eighth. Inculcate a love of labor for its own sake, not for mere reward. The great physiologist, Prof. Jacques Loeb, under this caption, says: "Human happiness is based upon the possibility of a natural and harmonious satisfaction of the instincts. One of the most important instincts is usually not even recognized as such—namely, the instinct of workmanship. Lawyers, criminologists and philosophers frequently imagine that only want makes man work. This is an erroneous view. We are forced to be active in the same way as ants or bees. The instinct of workmanship would be the greatest source of happiness if it were not for the fact that our present social and economic organization allows only a few to gratify this instinct."

Prof. Felix Adler, in discussing the ethics of reward for good behavior, says: "What we should try to banish is the vicious idea of extraneous reward—the notion that man is an animal whose object in life is to eat and drink, to possess gold and fine garments, and to gratify every lower desire, and that he can be brought to labor only on condition that he may obtain such pleasures. We should be taught to find compensating satisfaction in labor itself." This is clearly an ethical view, and it is also eminently scientific. We must begin early to inculcate the pleasure of work as such. In the kindergarten movement an effort is being made to unite play and instruction, and, in the manual training work, to unite creative processes with instruction.

We have now reached that division of our subject which relates to punishment of children. This is the most controversial part of my program, for everybody has his own views on punishment. But if my remarks on the handling of the rod appear too dogmatic and unorthodox I have on my side some of the greatest educators of the world. In this country Prof. Felix Adler has given us in a series of brilliant lectures the most illuminating and liberal views on child discipline. In the preparation of the following remarks on punishment I have freely drawn upon his celebrated lecture on this subject.

1. Punishment should not be administered when one is angry, because anger deprives one of reason and judgment and of the ability to mete out the punishment adequate to the wrong committed. Everybody knows how an insignificant annoyance can put one into a furious rage when one's mood is attuned thereto, while a real wrong may at another time produce a feeling of sympathy for the wrongdoer. No one can trust himself when in a state of anger. It is related of an ancient philosopher who, when he discovered that his friend whom he trusted implicitly had ignominiously wronged him, cried out: "If I were not so angry I should do violence to you."

2. Never identify the child with its fault. The fault should be considered as something accidental and not as part of the child. Instead of saying, "You are a liar!" when a falsehood is told, the better plan is to say something like this: "You have told a falsehood; you will surely not do so again; hereafter you will tell the truth." Remember that the child lives for a long time in wonderland; fabrication may be due to a

too lively imagination. If this be the case, the remedy is to insist upon a rigid adherence to facts and the avoidance of anything that may overstimulate the child's fantasy. How often is a child told that "he is good for nothing," "stupid," an "idiot," ready for the "reform school," when the parent least suspects that he is thereby suggesting to the child the road he will travel. The transgressor should be inspired with confidence, should be lifted up instead of pushed down. The child should be given to understand that in spite of repeated failure there is hope for amendment. The slightest improvement should be utilized as a lever to accomplish more, by clearly demonstrating to the child that it is progressing in the right direction. Not only in blaming and criticising, but also in distributing praise, must we be guarded in our expressions. It is certainly bad policy to use the words "excellent," "perfect," "first-class." None of us is perfect, for if we were we should not need to strive for greater excellence. You tell the child that he is perfect and what need is there for him to go on improving? Unwise praise has the added effect of making the child conceited. Rather tell him that he has done well and that if he continues as he has begun he will do better still.

3. Do not lecture children. Let your measures speak for themselves. Long lectures accomplish nothing; they usually "pass in at one ear and out at the other." Reprimands should be clear, short and definite. The child is quick to learn his parents' characteristics; he knows a vacillating parent from one who is consistent. Do not threaten without a firm determination to carry out your threat. One should be careful of what he says, but once the command has been uttered we must insist upon implicit obedience.

4. Do not administer corporal punishment; in doing so you put the child on the level of the brute. Under certain conditions we are justified in using the whip on a lazy beast of burden, but hardly ever upon a child. Corporal chastisement brutalizes the child; and its frequent repetition extinguishes the sense of shame and degrades character. It breaks the spirit of the child and makes either a coward who will fawn and beg off —or, what is still worse, it hardens the child against punishment—a circumstance often noted in the habitual or hardened criminal for whom punishment has lost its terrors.

My theme would be but imperfectly treated were I to omit a discussion of what is proper literature for the young and what instructions should be given in sexual matters. It is difficult to define what literature may be considered fit for the immature, but, speaking generally, I believe history, biography, essays on conduct and the classics to be devoid of danger. The Bible should be permitted in parts, leaving out the portions unsuitable for children. Novels of any kind, especially the prurient novel, should be banished from the child's literary diet. They do great damage to the young, immature brain, making it unfit for serious study, and initiate it into a knowledge of sexual matters of the most *blasé* type. No child should be permitted to read the daily newspaper, because it encourages a desultory habit of reading, thereby engendering an impatience for reading matter which requires concentration. Most of us read the daily newspaper and forget its contents as soon as finished.

Some of us, therefore, only read the headlines, and still others are content to look at the pictures. It were far better if we still had the old-fashioned weekly, which has unfortunately become extinct. As for the moral worth of the newspapers—what do they report? The most sensational crimes—infidelity and sexual aberration, divorce proceedings, circumstantial accounts of the most horrible happenings, executions, hold-ups, and forgeries. There is a type of newspaper called "yellow journal" which the other so-called decent papers constantly criticise. In my opinion the "yellow" press is not half as dangerous as our so-called "respectable" papers which depict in language perhaps better chosen—but still unmistakable—the orgies of the demi-monde and the crimes of the upper and under worlds. The daily newspaper is often unwittingly an instructor in crime and immorality and no school-child should be permitted to study its pages of obscenity.

I have now reached the last and most delicate portion in our discussion—namely, the instruction of the young in matters sexual. I am not sure that I am competent to solve this mooted problem satisfactorily. But as a physician with experience I have learned that almost all children, male and female, get their first sexual knowledge from their companions instead of their parents and educators. This is wrong in theory and practice. First, because the information can not be appropriately given by one child to another; secondly, because with it usually goes a knowledge of the practice of vices which undermine their physical and moral statures. The shock of the discovery by a girl of the first manifestations of womanhood has not seldom given rise to a series of nervous attacks, which may have been prevented if the mother had instructed her ignorant child in the rudiments of sexual hygiene. Occasionally a girl, uninstructed in regard to her nature and groping in the dark, will make unnecesary investigations, which may land her upon the rock of vice. To what an alarming extent sexual error exists among our boys only those know who are constantly brought face to face with its disastrous consequences. The subject of sex is distasteful and carefully avoided in good society, but this reminds one of the old proverb which says, "that in the hangman's house no one speaks of the rope." Perhaps this is why people whose conscience is guilty in regard to sexual matters avoid any references to the sexual life with the scrupulous anxiety of criminals caught in the act. "How to best impart a knowledge of proper sexual hygiene to the innocent" has recently become a favorite theme for discussion among the best educators of the land. It is generally believed that the subject can be appropriately taught by a reference to Nature. Sex methods can be illustrated throughout living Nature by a gradual approach from the lowest forms to the highest so as to give least offense to our usual ideas of propriety. The study of biology removes all mystery from the subject and satisfies our half-grown inquisitive children and, at the same time, affords an opportunity for explanations of a practical character. This may be done by the teacher or the educated mother. I am of the opinion that the father should warn the boys against sexual abuse, while the mother should possess enough tact to teach her daughters. The question as to the best time to undertake this task will depend on

circumstances. There is less danger in too early instruction than in being too late. The greatest stress must be placed upon the immoralities and upon the dangers to body and mind.

I often wonder whether woman has not neglected the most noble vocation in her life—the rearing of the best possible generation. Woman has proven her equality to man in all the learned professions; the profession of maternity, in which Nature has made her man's superior, she has wilfully neglected. Is there a nobler work imaginable than that of rearing a strong moral and intellectual race of men and women? But, alas, in too many instances our modern women permit peasant girls—or, at least, women of the inferior class—to rear their children, to instill into their young minds the most fanatical superstitions and, perhaps, to corrupt their little bodies. If we wish to bring up the proper kind of posterity we must take a hand in the business ourselves.

To accomplish this satisfactorily woman must acquire some knowledge of the groundwork of biology and some acquaintance with the natural history of animal forms. The time spent in these studies and their practical application to human wants will ultimately result in great good to future generations.

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## TYPHOID FEVER FROM A MUNICIPAL STANDPOINT*

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From a municipal standpoint typhoid fever is a preventable disease. Lord Palmerson long ago said that for every death from typhoid fever some one should be hung. This extreme view of England's prime minister was not taken without a full knowledge of the manner in which typhoid fever infection is conveyed from one person to another. But the theoretical man in his study fails to see some of the difficulties that confront the practical sanitarian when in the field face to face with epidemic conditions.

Enough is known about typhoid fever and the manner of transmission of typhoid infection to practically blot it out if the municipal health officer could be clothed with arbitrary power and have sufficient means available to enforce rules and regulations known to be necessary to accomplish such a result. But as practical sanitarians we must meet the conditions as we find them and use to the best advantage the means with which we are provided. I will briefly mention some of the general duties of the sanitarian. The municipal sanitarian must see that the inhabitants have an abundant water supply free from contamination. He must see that the sewage is disposed of without danger to any one. He must provide for the disposal of garbage and household refuse in a sanitary manner. Milk and other food supplies must be under his control and supervision to such an extent as to enable him to stop the sale or distribution of any food contaminated by typhoid infection or coming from places where typhoid fever is known to exist. He must see that houses, privies, yard vaults and premises are made and kept sanitary. He should fight for a pure atmosphere, and I believe that under present conditions we should do what we can to substitute motor cars for horses. Three-fourths of the dirt and litter in the streets and alleys of a city comes from the horse. The horse litter is the favorite breeding place for flies. Take the 80,000 horses out of Chicago, sprinkle kerosene in the garbage boxes,

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and the flies would have but few resorts. The dumping grounds for garbage as now conducted, the privy vault and the unscreened dirty household would be about all that stands between the fly and his extermination.

There is no time to go into details concerning these health measures which emanate from the municipal health officer nor to discuss what has or has not been done in Chicago. Much has been done in this city to protect health, and if it were not for the unfavorable conditions in the surrounding cities, towns and country, typhoid fever would be at the present time almost unknown in Chicago. Fifty per cent. of the cases of typhoid fever are direct importations from places outside of Chicago where the disease is known to exist. All the cities at the southern end of Lake Michigan are putting their sewage into the lake, and from this polluted water securing their drinking water through intakes near the shore. Typhoid fever is constantly present in these near-by cities and a considerable number of persons living in Chicago work in these places. A large number of the remaining 50 per cent. is known to be caused by infected milk brought into the city from farms where typhoid fever has been found to exist.

An instance where typhoid fever was brought into the city in milk was found in the Stock Yards district. A considerable number of cases of typhoid fever were found to exist in the homes of families who were supplied with milk from one source, and the milk dealer himself had a case of typhoid fever in his family. The Department of Health stopped the sale of milk by this man and sent inspectors into the country to investigate the farms from which this milk dealer procured his milk. At one of the farms was found a bad sanitary condition. Three cases of typhoid fever had, one after another, existed there for a period of three months. The bowel and bladder discharges of these patients were thrown out on the ground which sloped towards two shallow wells, one eleven and the other thirteen feet deep. The milk cans were washed in water from these wells. No more milk was allowed to be shipped to Chicago from this farm, and the typhoid fever subsided promptly in the area where this milk had been sold.

Another notable instance occurred in West Pullman. An outbreak of typhoid fever occurring almost exclusively in the families supplied by one milk dealer. This dealer was promptly asked to give a list of the farms from which he was procuring milk. A visit to all the farms in the list furnished by the milk dealer resulted in discovering no source of the infection. A week later a sudden increase in the number of cases, all in families supplied by this dealer, caused the Department of Health to close the man's business and investigate still further. At this stage of the trouble the milk dealer gave the name of another farm in Lake county, Indiana, which he had withheld because he knew there was a case of typhoid fever at that farm, as it afterwards proved. A visit to the farm revealed the presence of a case of typhoid fever just recovered, and it was learned that the Chicago dealer had been to the farm and had seen the case and knew all the time that he was selling the milk from a typhoid infected source. The state of Indiana promptly fined the farmer for his part in the murderous trade. The Chicago dealer is not yet through with his reckoning.

With the above conditions present—and most large cities are menaced in a similar way—the complete elimination of typhoid fever is a difficult problem. The earth is a great sponge, absorbing the excrements of over a billion, six hundred million human beings. These excrements find their way into almost every water supply at some time. In many instances they are carried considerable distances to contaminate water supplies. It is known that the bacillus of typhoid will exist two months in moist soil, twenty-five days in dust, twenty-three days in a fly's intestines. Sunlight does not kill typhoid bacilli. Thirty per cent. of the germs will survive one week in water, 10 per cent. will survive two weeks in water, 3 per cent. will survive three weeks in water, and 1 per cent. will survive six weeks in water. It is not known how long a few virulent germs may survive in water and the few will become millions if they reach the milk supply. With the germs ever present somewhere and millions of ignorant people over whose actions we can have but partial control, it is, under present conditions, impossible to completely eradicate typhoid fever, notwithstanding the fact that

we have knowledge sufficient, if applied, to sweep the disease from the face of the earth. The practical important preliminary for the municipal health officer is to have a knowledge of every case in the city. To this end, doctors should promptly report every case of which they have knowledge. Each case is a center of infection from which it is possible for others to contract the disease. The health officer has no concern about the treatment, but has much concern about the management of the case. He has a public duty to perform. It is his duty to learn the source of infection, to prevent others from contracting the disease from the same source and to prevent further extension of the disease from the reported case. He must visit every case of which he has knowledge and inquire into the food supply. The inquiry is for the purpose of learning how or through what medium the excrements from a typhoid fever patient got into this new victim's mouth. In general the greatest number receive the infection through the water supply—71 per cent. The milk supply is next in frequency—17 per cent. Milk, though, is frequently contaminated by water, by adding infected water or washing milk containers in contaminated water. Other sources of contamination of milk are dirty hands, infected dust and flies. Cheese, butter, ice cream, shell fish, oysters, air-borne dust and clothing, handkerchiefs, sheets and even body clothing are some of the less frequent sources of the disease. The soil—that is, susceptible persons—is always present. The seed, the typhoid bacilli, is always present somewhere and the sower of the seed is always present somewhere. The latter may be a well person carrying the seeds of typhoid. Again, the source of the disease may be the latest case going about with typhoid germs chronically present in the bowel discharges or it may be a convalescent typhoid patient.

New York has a case, reported in *The Journal of the American Medical Association* about a year ago, which successively communicated typhoid fever to six families where she had been employed as a domestic. This woman is still under restraint in New York after a period of 450 days. We have a similar case in Chicago now under restraint in a hospital. This girl had typhoid fever last spring. Six months later she went to work in a doctor's family, and soon after a member of the doctor's family came down with typhoid fever. An exhaustive study of the case revealed no source of the infection, except from the girl, in whose excrements the typhoid germ was found in abundance. Now, as to the management of the case in the house: In most instances we find the family physician gives proper instructions to the family or nurse for disinfecting or destroying the excretions emanating from a typhoid patient, but some do not, and it then becomes necessary for the health officer to instruct the family how to protect the public health. The house should be screened against flies, especially keep flies out of the kitchen, dining room and away from the milk and other foods. In poor families, where there is inadequate house room and no nurse, I would advise the family to drink or eat nothing that has not been boiled or cooked. Perhaps it is safer for all to follow this rule when typhoid fever is present in the house, no matter how well the sick room is guarded. Visitors should be kept out of the patient's room, even when the patient is in a convalescent stage, for all who come in contact with a typhoid fever patient are in some danger. If a visitor is admitted he should touch nothing in the room. Typhoid fever is a systemic disease and the germ is found in the blood, the bowel and bladder discharges, the vomit, sputum, saliva, and nose discharges, and on the skin. The patient's hands may convey the germs to others in shaking hands, which may be conveyed to the mouth. Every excretion from the patient must be disinfected. Even the bath water in which the hands, face or body of the patient has been washed, must be disinfected before being disposed of. Everything that is taken from the room must be disinfected, dishes, knives, forks, blankets, sheets, etc., as in cases of diphtheria. The hands of the nurse should be washed and disinfected every time she touches the patient. The best disinfectant for typhoid fever is sulphate of copper (blue vitriol). It is odorless and cheap, costing at retail but ten cents a pound. Two pounds dissolved in five gallons of water and kept covered in a stone jar should be provided at the beginning of every case of typhoid fever. Keep a pint of this solution in a vessel for receiving the bowel

and bladder discharges. Stir the discharges to break up the hardened masses and let stand for half an hour before emptying. Immerse all bedding, such as sheets, pillow slips, handkerchiefs and other things taken from the room in this solution or in a 5 per cent. solution of carbolic acid and water. Keep the cuspidor, if used, supplied with the same solution. The water closet should always be disinfected when used by the patient. Typhoid fever is a filth disease. Ignorance and filthy habits perpetuate the disease. Handle a case with surgical cleanliness and the disease will not be conveyed to others.

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# IMMUNITY.

## A REVIEW OF OUR KNOWLEDGE CONCERNING OPSONINS, AGGRESSINS, ANAPHYLAXIS, PHAGOCYTOSIS AND IMMUNITY.*

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In my previous paper on the subject of bacterial attack and cell and serum defense I considered toxins, antitoxins, agglutinins, precipitins, cytotoxins or cytolysins and bacteriolysins. In this paper I shall endeavor to present clearly, but as concisely as possible without sacrificing clearness, the important subjects of opsonins, aggressins, anaphylaxis, phagocytosis and immunity. The term opsonin is derived from the Latin verb opsono, meaning "I cater for," and the reason for the use of this term is the following: Certain observers, viz., Douglas and Sir A. E. Wright, employing Leishman's method of observing phagocytosis of bacteria by leucocytes outside the body and under the microscope, discovered that under ordinary conditions the polymorphonuclear leucocytes do not freely take up and digest bacteria, unless certain thermostabile substances be present in the blood serum, which, therefore, on account of their auxiliary action, they named opsonins, and to the presence or relative absence of these opsonins they attribute to a large extent either the eventual destruction of the bacteria by phagocytic activity or, on the other hand, the continued multiplication of the bacteria within the body. They found, for example, that the leucocytes from a patient suffering with chronic furunculosis or other pyococcic or streptococcic disease are able to take up abundant cocci if removed from the patient's blood serum by centrifugation and placed in the serum of a normal, healthy person. In fifteen minutes at 37° C. such leucocytes may each have taken up from 15 to 30 cocci added to the suspension, whereas under the same conditions the leucocytes in the patient's own serum may have been almost inert, taking up practically no cocci. And, on the other hand, the leucocytes from a healthy person, placed in the blood serum of the patient, may also show scarcely any phagocytic action. This phagocytic activity is therefore not merely a matter of leucocytic activity, but is favored and

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stimulated by the action of some substance in the blood serum, and this substance is known as opsonin. Neufeld has also described what is evidently the same substance under the name cytotropic substance. He found that the serum of animals, immunized against streptococci, pneumococci and erythrocytes, contains substances which act upon the bacteria or foreign blood cells in such a way as to favor their ingestion by leucocytes. He found also, as Wright did with the opsonins, that these substances were thermostabile—i. e., they could be heated to 59 C. for half an hour without being destroyed—and that they became fixed by the bacteria but not by the leucocytes.

It would be interesting and instructive, but would require altogether too much time, to give some account of Wright's observations and experiments, but I will give only a few of the important conclusions..

1. In a large number of infections there exist in the blood serum certain protective substances known as opsonins.

2. The opsonins act upon the bacteria so that the latter can subsequently be ingested by the leucocytes.

3. When different bloods are compared the variable factor is the serum and not the leucocytes. This does not mean that the leucocytes of different persons do not vary in their phagocytic activity, but that, as a rule, the variations in the activity of the leucocytes are so slight, compared with the range of variation of the opsonic power of the blood sera, that they may practically be neglected. When leucocytes are suspended in normal saline solution, serum and opsonins being entirely absent, they will ingest bacteria to a slight extent and very slowly indeed, while in normal serum at body temperature normal polymorphonuclear leucocytes will within fifteen minutes take up abundant bacteria. Not simply an occasional coccus, but from 30 to 50 may be counted within a single leucocyte.

4. The specific opsonin is used up when bacteria are added to a serum, so that on removing the bacteria and adding this serum to a second portion of the same bacterial emulsion it is inactive—there is no more phagocytosis.

5. The opsonins become combined, or at least absorbed, by the bacteria, so that if these bacteria are then removed and placed in another serum which has been rendered inactive it again becomes active and, if it contains leucocytes or these are added to it, they freely ingest the bacteria.

6. This combination of opsonins with the bacteria is probably a firm chemical union since long heating at 60° C. will not destroy the opsonic action.

7. Normal serum contains normal opsonin, but after vaccination with the cultures of different bacteria there are developed specific opsonins.

8. By careful vaccination with measured small quantities of dead cultures of various pathogenic bacteria, including the pyococcus aureus,

gonococcus, bacillus coli and tubercle bacillus, it is possible to increase markedly the opsonizing power of the person's serum.

9. Regarding phagocytosis as the main process by which bacteria are destroyed within the body and the opsonins as the means by which the bacteria are prepared for ingestion by the leucocytes, Sir Wright has decided that the relative amount of opsonins in a given serum gives an indication of the defensive powers of the individual against bacterial attack; for this purpose he has established what is known as the "opsonic index." This means the ratio between the average number of bacteria found within 20 to 40 polymorphonuclear leucocytes of an emulsion made with the patient's serum and the number of bacteria found in the same number of like leucocytes in an emulsion made with normal serum, the latter being taken as 1, or unity. For greater certainty a so-called "pooled normal serum" may be employed—i. e., a combination of the sera of five or more apparently normal persons. In most infections the opsonic index is found to be below 1. With carefully measured subcutaneous injections of dead specific bacteria there results a rise of the opsonic index and this rise corresponds to an obvious improvement in the general condition of the patient and the local manifestations of the disease. By carefully watching the index it is possible by successive vaccinations to bring up the index in successive steps until it reaches and exceeds the normal, and coincidently in these diseases a very material improvement is to be recognized, if not complete arrest of the morbid process. This is particularly the case with conditions due to the pyococcus aureus. Good results are also obtainable in certain cases of gonorrhea, colon bacillus infections and some other diseases, including tuberculosis, although in the latter disease it can not be said that the opsonic index affords clear indications. The want of certainty in the readings has indeed made many observers very skeptical regarding the full carrying out of Sir Wright's technic; but, while it has to be admitted that all do not react similarly to successive vaccinations and that even in his own practice Wright encounters not a few obstinate cases which do not react satisfactorily to his vaccinations, yet, on the other hand, in certain infections, especially of a chronic or subchronic type, there are such remarkable cures that it is impossible not to see that the method, if not complete, has in it a material advance upon any previous attempts at treatment by vaccination and elevation of the defensive powers of the body during the course of a disease.

It would be quite interesting but would require far too much time to consider the results of vaccination and the use of the opsonic index in pus infections, gonorrhea, pneumonia, diphtheria, scarlet fever, typhoid, tuberculosis, etc., but I will try to say a few words along these lines before closing the paper.

I will next consider the subject of aggressins, which, as the name indicates, are substances present in bacteria which increase their aggressiveness or virulence. They are responsible for the phenomena which are

observed and described as "exaltation of virulence," produced by the passage of bacteria through a succession of animals of one species. Now the virulence of bacteria is not simply due to the production of toxins alone. As we already know, toxins are divided into exotoxins, which are excreted and set free by bacteria and endotoxins, which are contained within and are inseparable from the bacteria. The cholera spirillum, anthrax bacillus and some other pathogenic germs produce endotoxins almost exclusively and we have not the slightest evidence that when these bacteria become more virulent the production of exotoxins is at all increased, for the filtered culture fluid from a 24 hour culture of the most virulent strain produces no more symptoms than does that from the most attenuated strain. Nevertheless, if the attenuated bacteria are injected into an animal or fluid containing normal leucocytes, phagocytosis begins at once, while, if the virulent bacteria are injected, there is no phagocytosis. In other words, it seems quite evident that the living virulent bacteria excrete or discharge substances, which are not properly toxins but which, nevertheless, have an inhibitive or "anti" action upon the cells or leucocytes—substances which are not necessarily taken up by the body cells or leucocytes and destroyed, but which either neutralize the action of the opsonins or directly repel the leucocytes, this repulsion being greater than the attraction exerted by the other bacterial substances. It is these substances, which either neutralize the action of the opsonins or repel the leucocytes, which are called aggressins.

Other experiments have proven that the greater the resistance of the body to the bacteria, the more active is the production of these aggressins. They are produced in greater quantities during the struggle between the bacteria and the body cells or leucocytes, while comparatively few are produced in a plate or test-tube culture. Bail regards these aggressins as new undescribed substances, while others regard them as free bacterial receptors or haptophores (such as those described in Ehrlich's side-chain theory), and these latter observers believe that these free or discharged receptors combine with the amboceptors, described in my previous paper, producing, as it were, a diversion of the amboceptor, so that the bacteria themselves are not attacked and so continue to proliferate. Granting, however, that this view is correct, yet it is evident that these receptors are neither endotoxins or exotoxins, for the fluid containing them is free from toxic action. If these substances are to be regarded as receptors they have no toxophores, but only haptophores. The existence of aggressins most likely explains certain observations, viz., that exudates produced by the local growth of a particular pathogenic germ contain no opsonins. Perhaps it may be more correct to say that under these conditions there is not really an absence of opsonins but a neutralization of them by the bacterial aggressins. Probably the aggressins bear much the same relation to the bacteria as the opsonins do to the leucocytes, and whether the course of an infectious disease ends in recovery or death is doubtless very largely, if not altogether,

dependent upon whether the opsonins or the aggressins win out in this struggle between the leucocytes and the bacteria.

I shall next consider the very interesting and important phenomena known as anaphylaxis. From the early days of the employment of diphtheritic antitoxin occasional cases have been reported of sudden death following the injection of the serum. In 1906 Anderson and Rosenau were able to collect records of 19 such cases. The symptoms in such cases might appear within five minutes after the injection in the form of collapse, unconsciousness or convulsions. Mild cases, with urticarial rashes and sometimes nausea, are comparatively common. It has been clearly proven that such symptoms are not due to the toxin or antitoxin, but to the serum itself, as normal horse serum produces identical effects. Fatal effects have also followed the transfusion of the blood of sheep or other animals into man in cases of grave anemia. Such transfusion led to after effects so severe—high fever, hemorrhages and intravascular clotting—and was so often fatal, that the practice was soon abandoned. Some cases were much milder, simply showing fever and urticaria. Experimental observation upon these phenomena have led to some remarkable results. If a moderately large dose of a foreign serum be injected into an animal, either subcutaneously or into the peritoneum, no immediate effects are produced and the animal in a few days becomes immunized to that serum. But if, instead of a moderately large dose at first, a guinea-pig be given as little as 1/100,000 of a cubic centimeter of a foreign blood serum and then, after twelve days, a second injection of 5 c.c. be given, the guinea-pig is very apt to die, perhaps within a few minutes or, at most, within a few hours. Instead of being rendered immune, the opposite result has been brought about—viz., the animal has been "sensitized"—i. e., rendered far more susceptible to the foreign serum. This process of so-called "sensitization" has received the name of anaphylaxis. It has been found also that in herbivorous animals the same results may be gained by feeding with the foreign serum. Some investigators have shown that the subjects of anaphylaxis exhibit hemorrhages in the stomach, cecum, lungs, spleen, heart and adrenals; these appear to be associated with a fatty degeneration of the capillary endothelium. Moreover, the blood of the sensitized animals comes to contain a substance which, when the blood is injected into other guinea-pigs, sensitizes them also. In man and omnivorous animals a single dose sometimes has the same effect that the two doses possess in rabbits and guinea-pigs.

Various theories have been proposed to explain the peculiar phenomena of anaphylaxis, but the most satisfactory one is based upon Vaughan's remarkable studies upon bacterial and other proteins. It would require altogether too much time to go into these in detail, but the main points are that the bacterial proteins may be split up into two portions—one poisonous and the other non-poisonous—and that this is true of even the apparently most harmless of proteins, egg-albumen.

This, when extracted by 2 per cent. sodium hydroxid in absolute alcohol, is as quickly fatal to guinea-pigs as the toxin obtained from the proteins of the colon or typhoid bacillus. This poison acts chiefly upon the brain, more especially upon the respiratory center, causing fatal disturbance. Reasons are given why this splitting up of the protein into its poisonous and non-poisonous portions occurs most often when a minute preliminary dose is given and rather rarely when the preliminary dose is comparatively large. Adami believes that this very closely resembles the breaking up of a minute quantity of salt into its elements, sodium and chlorin, when it is dissolved in a large amount of water, while this occurs very slightly when a comparatively large amount of salt is dissolved. The small amount of poison in the preliminary dose does no appreciable harm, but Adami believes that the body cells then form the habit of attracting to themselves the non-poisonous portion of the protein, thus setting free the poisonous part to act upon the brain centers, and when the second, much larger, dose is given in 10 to 12 days after the first dose, so much poison is set free to attack the vital centers as to quickly produce a fatal result. This entrance of the poisonous part into the general circulation may, however, happen very quickly in transfusion experiments or in preliminary large doses of protein, and in this way we can explain the fatal effects of serum injections. Usually, however, where a large preliminary dose is given, the body becomes immunized to the whole protein.

Let us now consider for a few moments the important quality of phagocytosis possessed especially by the polymorphonuclear leucocytes. This property of actively taking up foreign particles, organic and inorganic, is primarily nutritional—a means whereby the individual cell gains food material. Such particles of matter, when so taken up by the cell, if unfit for assimilation are discharged, but if capable of affording nourishment they stimulate the formation of a digestive vacuole around them, in which vacuoles we have indications of the presence of digestive ferments, and, lying thus in the fluid, the foreign matter is seen microscopically to undergo solution until all that remains are a few granules of unassimilable débris which are eventually cast out. Among such foreign bodies, which these phagocytic cells are able to take up, are the various bacteria, animal and vegetable. These germs, as Metchnikoff has abundantly proven, may be taken up in the living condition and then, whether in the unicellular organism like the ameba or in the leucocytes, there is the same formation of digestive vacuoles and destruction of the bacteria by digestive processes. The coccus or bacillus within this digestive vacuole swells, becomes colorless and then dissolves. When a small platinum loopful of a suspension of pathogenic germs—for example, the pyococcus aureus—is added to a mixture of serum and leucocytes and kept in the incubator at 37° C. for fifteen minutes and a drop of the mixture be then examined, the number of bacteria seen within the leucocytes and undergoing digestion is very remarkable. There can be

no question about the importance of phagocytosis in the destruction of bacteria that gain entrance into the system, but there is considerable doubt whether this is the supreme method of destruction of germs and what its relation may be to the development of continued immunity.

It would require far too much time to even mention the various views and theories held by different investigators, but I will simply say a few words about the theory of Ehrlich's chief opponent, Metchnikoff, who believes that phagocytosis is practically the entire process but recognizes two broad groups of phagocytes, each having the power of acting more particularly upon one set of substances. He names these two groups the microphages, comprising polymorphonuclear leucocytes, eosinophiles, etc., and macrophages, including hyaline leucocytes, endothelial cells and fixed phagocytes, and believes that the former class is particularly active in opposing the bacteria of acute diseases, while the latter class is most efficient in defending from the bacteria of chronic diseases. He also does not at all agree with Ehrlich's theory of multiple complements, amboceptors, etc., but recognizes only two, which he calls microcystase and macrocystase, developed respectively by the microphages and macrophages. He also believes that the immune bodies are derived from the leucocytes. Without saying more about these opposing views, I will simply give Adami's conclusions, in which he tries to harmonize to some extent the conflicting theories of these two great investigators:

1. Phagocytosis proper (i. e., the ingestion and digestion of bacteria) is a great factor in the destruction of microbes entering the system.

2. By accustomance and adaptation to the products of bacterial growth and to other toxins, both on the part of the leucocytes and other potential phagocytes in a local area of infection and of the mother cells of those leucocytes in the bone marrow and elsewhere, the phagocytic capacity may be markedly increased and in this way a continued immunity be materially aided.

3. The cells which Metchnikoff regards as phagocytes and potential phagocytes, while they are those most commonly invoked to neutralize bacteria and bacterial and other toxins, are not the only cells of the organism possessing these powers.

4. With the exception of the red corpuscles (which are not cells proper), the rule would appear to be that those cells which take up microbes and microbic and other toxins are the cells which provide the antibodies.

5. Antibodies, whether present in the normal organism or developed in response to the introduction of particulate or dissolved toxins, are the products of cell activity and their presence in the blood is a secondary process, either a true secretion (in this resembling glandular secretion proper) or to some extent, where there is cell destruction, the result of that cytolysis and of the freeing of substances previously bound in the cells.

6. Produced within the cells, these antibodies can act within the cell and then bring about a condition indistinguishable from ordinary intracellular digestion, though their strikingly specific powers suggest thus that intracellular digestion, instead of being a simple single process, is one that varies to an almost infinite extent, according to the nature of the substance entering the cell.

7. They can act also outside the cell and in this case clearly neutralize the toxin by entering into combination with it.

8. Whether, therefore, we regard and study the immunity as occurring within the cell or apart from it, eventually we arrive at a common underlying chemical and physical ground work, for, although differences exist in respect to details, fundamentally the phagocytosis and the side-chain theories are not contradictory; they merely view the one set of phenomena from different aspects.

In my previous paper I described Ehrlich's side-chain theory of the formation of antitoxins and their protective action and transfer of immunity to other organisms when injected before or during the course of disease. Let us now consider his side-chain theory expanded, so as to include not only the production of antitoxins but of agglutinins, precipitins, opsonins, cytolysins, bacteriolysins and the rest of the so-called antibodies, and first it may be of interest and profit to name the various enzymes, toxins, venoms, etc., and the respective antibodies which they stimulate the cells of the organism to produce. I will name in order first the enzyme or toxin and then the antibody which it stimulates the organism to produce.

1. Enzymes ..... Antienzymes
2. Phytotoxins ..... Antiphytotoxins
3. Bacterial exotoxins ..... Antitoxins
4. Proteins (animal or vegetable) ..... Precipitins
5. Bacterial proteins ..... Agglutinins
6. Bacterial aggressins ..... Opsonins
7. Animal venoms (simple) ..... Antivenins
8. Animal venoms, complex, requiring intermediation of complement to act ..... Antihemolysins
9. Foreign complements ..... Anticomplements
10. Foreign amboceptors ..... Antiamboceptors

All these act without intermediate aid, but the following require the interaction of a specific amboceptor and a non-specific complement:

11. Vegetable cells (bacterial) ..... Bacteriolysins

12. Animal cells of various orders stimulate to production of cytolysins, hemolysins, leukotoxins, hepatotoxins, nephrotoxins, spermatoxins and toxins in fact from most, if not all, of the glandular organs.

In order to explain the formation of these different antibodies Ehrlich divides the receptors or side-chains, which are identical terms as applied to the cell, into three orders or classes.

1. The first class is composed of side-chains, possessing simply a haptophore, to which the toxin becomes attached or anchored by its haptophore. These side-chains unite then only with the relatively simple toxins and ferments and set free antitoxins and antienzymes.

A. Haptophore, receptor or side-chain of cell; B. Haptophore of toxin or ferment; C. Toxophore of toxin or ferment.

2. The second class of side-chains is more complex in order to unite with compound protein molecules and set free precipitins and agglutinins, with aggressins to set free the opsonins and with simple and complex animal venoms to set free antivenins, antihemolysins, etc. Here

A. Haptophore of side-chain; B. Zymophore of side-chain; C. Compound protein molecule, aggressin or animal venom, simple or complex; D. Zymophore.

there is not only an anchoring action by the side chain, but also a fermenting and dissociating action, the side-chain possessing both a haptophore for anchoring and a zymophore for dissociation of the protein or venom.

A. Haptophore for anchoring animal or bacterial cell; B. Haptophore for anchoring complement; C. Animal or bacterial cell; D. Haptophore of complement; E. Complement; F. Zymophore of complement.

3. The third class of side-chains, in order to unite with the still more complex substance of animal and bacterial cells, must anchor not only the cell molecule, but also the complement, and the complement

possesses not only a haptophore but a zymophore. Here the union of side-chains with bacterial or animal cell and complement is shown.

When these receptors or side-chains are produced in excess and discharged they are called haptines by Ehrlich. They possess the same properties of attachment as they do when existing as fixed side-chains of the protoplasmic cell and, corresponding with the three orders of fixed side-chains, Ehrlich recognizes three orders of free side-chains or haptines, the first order including antitoxins and antienzymes, the second order including agglutinins, precipitins, opsonins, etc., and the third order, known also as amboceptors, including the bacteriolysins, cytolysins, nephrotoxins, etc. The various free receptors which stimulate the cell to form antibodies are often called antigens.

A great deal more might be said on this subject, and also on the relation of toxins to enzymes, but I will give only two or three of Adami's conclusions and his modification of Ehrlich's side-chain theory of immunity very briefly. He says that if toxins are bodies of the same order as enzymes or ferments—and he believes they are—it follows that the antitoxic side-chains, developed in reaction to the presence of toxins, are not identical with those dissociated by the toxins, whose dissociation leads to the symptoms of disease. Or, in other words, something in addition to the mere proliferation and excessive reproduction of the side-chains attacked by the toxin molecules, is necessary in order to explain immunity. Adami believes that the toxin molecule does not simply become attached to the biophoric or protoplasmic molecule by one of its side-chains, but that it detaches the side-chain and then delivers or hands over this detached side-chain to a recipient which has a greater affinity for it and then the toxin molecule is free to act upon and detach another side-chain and this process is indefinitely repeated. He believes also that it is this detached side-chain, plus the recipient with which it has united, that forms the antitoxin or the agglutinin, precipitin, opsonin, bacteriolysin or cytolysin, as the case may be, according to the nature of the attacking toxin and the order of side-chain detached by it. He believes further that the detached side-chain, while still contained within the cell protoplasm, has no protective action and so confers no immunity, the toxin having greater affinity for the still adherent similar side-chains of the protoplasmic molecules, but when the excess of such side-chains, plus the recipients to which they become attached, is discharged into the blood stream, then any circulating toxins, not being drawn by the greater attraction of the adherent side-chains of the cells which they specifically influence, join with these antitoxins—i. e., free side chains plus recipients—and become neutralized by them, and so are not attracted to and taken up by the cells. So much for this important and interesting but rather difficult subject of a satisfactory theory of immunity.

Just a few words in conclusion on the specific opsonins and the value of the opsonic index according to different observers. Varney believes

that in bacterial inoculations we possess a therapeutic agent with a specificity of great merit and that Wright's method of obtaining the resisting power of a patient is of unquestionable value as a guide to determine what will raise the resistance. He believes further that proper autogenous vaccinations, administered in appropriate doses, when the patient's opsonic index indicates the necessity for revaccination, is a harmless, quick and efficient treatment in certain chronic localized infections yet to be classified. Bolduan states that there is considerable variation in the opsonic power of serum from a number of apparently normal individuals and that duplicate and triplicate tests, made with the same serum at the same time and under apparently identical conditions, often yield widely divergent results. He finds also that clinical results with bacterial inoculations do not always parallel the opsonic indices and that patients sometimes do well with decreased opsonic index and vice versa. Da Costa believes that the opsonic index is very useful in the diagnosis of early tuberculosis, the index to the tubercle bacillus being very low or very high, the former suggesting predisposition, the latter showing infection against which the resisting powers are raised in defense. Contrary to Wright and others, Tunnicliff shows that the diphtheria bacillus is sensitive to the opsonic action of human and rabbit blood serum. It was found that in diphtheria the opsonic index for diphtheria bacilli is generally below normal at the onset of the disease. As the membrane disappears and the symptoms subside the index rises considerably, returning to normal in two to nine days. In the majority of cases there is a rise in the streptococco-opsonic index in diphtheria, but the indices for diphtheria bacilli and streptococci rarely correspond. The injection of dead diphtheria bacilli in suitable number into rabbits is followed by a marked rise in the index. The suggestion is made that the injection of dead diphtheria bacilli may prove of some service in ridding the throat of bacilli in the case of chronic carriers and convalescents, as the experiments show that in rabbits such injections are harmless and, at the same time, cause decided increase in the opsonic power of the blood on diphtheria bacilli. Many investigations have been made in pneumonia, giving the following conclusions:

Avirulent pneumococci absorb opsonin and become susceptible to phagocytosis; virulent pneumococci do not absorb opsonin and are insusceptible to phagocytosis, and these properties may be diminished or increased at will by passage through rabbits or cultivation on artificial media, as the case may be. From the evidence at hand it would seem that opsonification and phagocytosis play a secondary and not a primary rôle in combating the pneumococcus infection in pneumonia, because, as has been shown, virulent pneumococci must be previously altered before they will absorb opsonin and become phagocytable.

Gabritchewski's vaccine has given reported good results in the prevention of scarlet fever. This vaccine is made from streptococci, isolated from the blood in the hearts of children dead of scarlet fever. It is a

condensed bouillon culture of streptococci, killed by heating to 60° C. and the addition of one-half per cent. carbolic acid solution. Usually 10 drops were injected hypodermatically and during an epidemic 185 persons were thus injected as a preventive measure, with the result that there was a general rash in 43, a local rash in 70 and no rash in 72, and only 2 of the 185 developed scarlet fever, the others remaining well except for the rash in 113 and some fever following the injection in all but one, this being quite marked in 66. More might be said regarding other diseases, but it would take too much time.

Hektoen summarizes as follows the considerations for the therapeutic inoculation of dead bacteria:

1. The power of the injected bacterial substances to stimulate the formation of opsonins and other specific antibodies.

2. The belief that increased formation of such substances may hasten healing of the corresponding infection.

3. The apparent inability of the body under certain conditions of natural infection to produce such substances in sufficient quantities without special stimulation. He gives as the essential prerequisites for therapeutic inoculation these three, viz.:

1. Correct etiologic diagnosis.

2. Sterilized pure cultures of the bacterium causing the infection in each disease or sterile products of such bacteria.

3. The injection of proper doses at proper intervals so as not to unnecessarily lower the antibacterial power or cause other unfavorable disturbances.

In the present state of our knowledge the fairest and wisest view of this subject is probably that given by Bevan in the general surgery of Lexer and himself. "It is impossible to estimate at this time how much reliance is to be placed upon the therapeutic inoculation of dead bacteria, because as yet chiefly isolated cases have been reported. But since the diseases in which such good results have been reported recover spontaneously, more extensive statistics and greater experience are needed before any satisfactory conclusions concerning the value of the therapeutic inoculation of dead bacteria can be made."

# ILLINOIS MEDICAL JOURNAL

THE OFFICIAL ORGAN OF THE ILLINOIS STATE MEDICAL SOCIETY.

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SEPTEMBER, 1909.

## DESPERATE STRAITS OF THE PROPRIETARY MEDICINE TRUST.

A circular entitled "Misleading the People" has reached this office attacking the medical profession in general and Dr. H. W. Wiley of the Department of Agriculture, Washington, in particular. There is so much of interest in this unsound and unfathered document that we publish it in full. Evidently these people are in a desperate strait and persistence on the part of the medical press and profession will shortly put them out of business.

Along the same line we are glad to note that the United States Post-office Department is throwing hot shot into the ranks of the "Cancer Cure Specialist" by refusing the use of the United States mails to this gentry. Recently a fraud order was issued for "The Dr. Curry Cancer Cure Company" of Lebanon, Ohio, who exploited "A Discovery that has Startled the Medical World," guaranteeing to cure the disease in ten to fifteen days for $25. On analysis the treatment was found to contain a certain amount of "dope" which might in some instances render temporary relief from pain.

A similar order has been issued against the notorious Dr. Bye of Indianapolis, Ind., whose "Certain Cure" is said to have been composed

mainly of cotton-seed oil and an ordinary tonic preparation taken internally and absolutely worthless for the cure of cancer.

Again we call upon the medical profession to lay before the Post-office authorities all the knowledge in their possession which may put an end to these disgraceful sorts of swindling.

The circular abusing the Doctors' Trust follows:

MISLEADING THE PEOPLE—HOW DR. WILEY COMPILES GOVERNMENT REPORTS TO SUSTAIN HIS PREJUDICED OPINIONS.

About two years ago the Doctors' Trust prevailed upon *Collier's Weekly* to publish what purported to be reports of 32 cases of poisoning by headache remedies, which reports, on investigation, proved to be made up entirely of falsehoods and misrepresentations. Of the entire 32 cases not one was truthfully reported and 21 were absolutely without foundation in fact. This was proven by the editor and publisher of *The Medical and Surgical Journal*, who, in an article entitled, "Collier's Methods Exposed," exploded every charge contained in the Collier articles and showed Samuel Hopkins Adams, their author, to be wholly unreliable and absolutely unprincipled. As soon as the American Medical Association (the Doctors' Trust) discovered that they had among them a journal edited by a man with the courage of his convictions, they were quick to realize that this journal would be of great harm to their cause and promptly deciding that the course of the journal must be turned to their good, they at once set about to accomplish the purchase of said journal. This they succeeded in doing and immediately combined it with one of the Association organs, since which time the American Medical Association has attempted to make a mystery of the discontinuance of the publication of *The Medical and Surgical Journal*.

However, the article in *The Medical and Surgical Journal* effectually stopped *Collier's* further assaults on these reliable headache remedies and, as no reputable publication could be found "yellow" enough to issue further assaults of this character, Dr. H. W. Wiley, the great Pooh Bah of the Department of Agriculture, was persuaded to use his power as a government officer to issue a false and misleading "Bulletin" along the same lines, at government expense. Feeling safe from damage suits because of his position, he issued his report along general lines, claiming to have compiled his data from a series of letters received from 400 doctors. He does not say who these doctors are and he does not say that he investigated their reports or responsibility in a single instance. He simply states that he sent a circular letter to 925 physicians containing certain questions and that he received 400 replies. With his wide acquaintance among doctors and his powerful influence among the leaders of the Doctors' Trust, it is easy to conceive that he could readily pick out 400 doctors in the trust whose prejudices are well known and who would gladly make any reply to the questions that they thought would please Wiley.

A demand has been made on the Department of Agriculture for permission to examine the said 400 reports in order to verify Dr. Wiley's conclusions from them, but this demand was peremptorily refused. The reasons for this refusal would be self-evident, even though Wiley's history in other cases were not known. For instance, Dr. Wiley was overruled by a superior power in the corn syrup case, and in the benzoate case, yet he travels about the country at government expense making speeches attacking the products which the government has held to be properly manufactured. In the same way, *i. e.*, at government expense, he sent out 20,000 copies of the late "Bulletin" to the newspapers of the United States, with a letter containing garbled abstracts from it, well knowing that few editors would wade through 86 pages of Bulletin when Dr. Wiley himself had *so very kindly* furnished in succinct form the substance of the report. Few editors suspected him of misusing his power to draw unjust conclusions from a Bulletin issued by the government, and probably no editor, who published Wiley's ab-

stract, suspected that he was being used as a catspaw to pull chestnuts out of the fire for the Doctors' Trust.

Furthermore, though a private individual can not obtain a single copy of Wiley's "Bulletin" except on payment of 10 cents, Wiley himself sent out 20,000 copies to special individuals who he thought would help to advance his personal cause and the cause of the "Doctors' Trust."

In our opinion there is absolutely no law justifying Dr. Wiley in using his official position to compile and issue reports of this character. Government reports should be unbiased, should contain both sides of a question, and should be compiled by persons having no preconceived opinions and no prejudices regarding the subject under investigation. Only the truth should find its way into public documents.

It is well known that the Doctors' Trust is engaged in a work to monopolize the business of curing disease, and if they can have laws enacted prohibiting people from using simple household remedies it means millions in the pockets of the doctors. As is well known, thousands upon thousands of headaches and other minor ills are cured daily by simple and harmless remedies procured from drug stores, and it is the intention of the Doctors' Trust to force every purchaser of the simplest item in the way of medicine to first procure a prescription; for, if they could forbid the use of headache and other household remedies without a physician's prescription, it would mean, as stated, millions of dollars to them. The Doctors' Trust therefore hopes to be able to so frighten the laity by means of the Wiley bulletin, that they will not only refrain from the purchase of these household remedies, but that the legislatures will actually enact laws forbidding the purchase of these simple remedies, excepting upon doctors' prescription. Truth, decency and honor must all be disregarded in order to accomplish their purpose.—*Our Foods and Drugs.*

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## ANOTHER PENITENT.

And still another member of the Forty-Sixth General Assembly rises to explain regarding his vote on the Osteopathic Bills. Hon. H. A. Shephard of Jerseyville is the latest occupant of the penitential chair. We append a letter written by him to Dr. M. B. Titterington of Jerseyville, a member of the Jersey County Medical Society. We also append a letter written by Hon. M. S. Link of Mitchell, whose change of front was noted in the last issue of THE JOURNAL before we had received his letter of explanation. We are glad to welcome both of these gentlemen to the ranks of the Illuminati.

August 12, 1909.

Dr. M. B. Titterington, Jerseyville, Ill.:

*My Dear Doctor:*—Relative to my vote on the Osteopathic Bills in the last General Assembly, I desire to say that I voted *against* Senate Bill No. 214 which was known as the one which provided for the appointment by the Governor of a board composed of osteopaths for the licensing of osteopaths, and I voted *for* Senate Bill No. 351, which, as I understood it at that time, required all osteopaths to be examined by the regular medical board and that they would be required to pass the same examination as all doctors do. I think I was not correctly informed on Senate Bill No. 351 at the time I voted for it, or I would not have done so. Yours very truly,

[Signed.] H. A. SHEPHARD,
Member Forty-sixth General Assembly, Thirty-eighth District.

MITCHELL, ILL., June 31, 1909.

Dr. E. W. Fiegenbaum, Edwardsville, Ill.:

*Dear Doctor:*—Yours received, and will say that I sent for the record of the House in relation to the vote on Senate Bill 351, and the record confirms the vote of THE MEDICAL JOURNAL. I received the report from Springfield the day before your last come to hand. I wish right here to declare a mistake has been made, for I have never, by expression or implication, action or otherwise, said one word in favor of this new doctrine of recognition of osteopathy, and should I be elected to become a member of the Forty-seventh, the medical fraternity that you are a member of, Doctor, will have no more ardent champion in that body than I will be. You have known me, Doctor, intimately for many years, and I believe that you will testify that I am a man of my word, that I would be one of the last to say or promise one thing and do another. There is no reason in the world why I should have voted for Senate Bill 351.

I acknowledge an oversight in not answering the card received from the secretary of the Chicago Medical Society. I remember receiving such a card from the office, but after my return from the postoffice, when the mail was assorted, the card in question was overlooked, and I acknowledge that I do need my fingers scorched if not actually burned for any carelessness or neglect that was apparently shown on my part as to the card.

I trust that this explanation will be satisfactory, and I am an unbeliever in Fads, Spooks or Hobgoblins; then I again reiterate that I did not note as recorded on the bill. Yours, etc.

[Signed.] M. S. LINK.

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## THE DISEASES AND DEATHS OF CHRISTIAN SCIENTISTS.

Christian Science has now existed long enough to begin to reap the harvest which all have anticipated for this most remarkable fad of the last century. A number of the leaders have already passed from earth and their departure gives opportunity to learn what caused their adherence to Mrs. Eddy's doctrines and to draw some lessons for the benefit of the medical profession which has been so heartily abused by these people.

One of the latest leaders to die was Edward A. Kimball, for twenty years a prominent member of what is called "The Christian Science Lecture Board." In the notice of his death we are informed that twenty years ago he became ill and was told by physicians that his malady was incurable. He met an associate of Mrs. Eddy and was cured by Christian Science. When he realized that death was at hand he declined the services of the physicians and said he supposed it was his time to go. He was 64 years old.

The lesson to be drawn on the part of the profession is that extreme care should be exercised in pronouncing the sentence of death in any event. Cases, especially of nervous diseases, are most deceptive and frequently recover where recovery may have seemed impossible. For this and many other reasons members of the profession should be extremely guarded in their expressions as to the termination of any sickness. Instead of stating that recovery is impossible, it is always a safe plan to say that the outlook is unfavorable but that recovery might occur.

A little care in this important detail would spare the profession many embarrassments and should not be neglected. Incidentally it would rob Christian Science of many opportunities to exploit its "miracles."

## THE COMING UNITED STATES CENSUS.

The Thirteenth United States Census will be taken next year and because of the importance of this enumeration from a scientific and sanitary standpoint the medical profession will be particularly interested. In the first place there will be no more important duty of the enumerators than the notation of the diseases and the death rate of the people. These items should be accurately and fully stated. This would seem to be an excellent opportunity for urging upon Congress the establishment of a health department with its head as a member of the President's cabinet. We should like to have our members interested in this important movement and insistent on sustaining the President in his efforts to secure honest and capable persons, regardless of their political affiliations. Here would seem to be an opportunity for young practitioners to secure employment temporarily. As no person afflicted with tuberculosis is eligible, it is apparent that every one of these appointees must pass through a medical examination, which we hope will be made carefully and that no consideration of friendship will permit the certification for appointment of anyone afflicted with this disease. As every appointee must have resided at least one year in the district, his medical history, if bad, will probably be known to the medical profession, and with proper care those diseased can not hope for work of this character.

The opportunity offered the medical profession by this decennial enumeration should not be neglected by the profession of Illinois.

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# Correspondence.

## THE SEPTIC TANKS OF CHAMPAIGN AND LAKE FOREST.

CHICAGO, Aug. 17, 1909.

TO THE EDITOR ILLINOIS MEDICAL JOURNAL, Springfield, Ill:

*Dear Sir:*—Kindly give the following correction an appropriate place in your paper:

In the discussion of Dr. Sanger Brown's paper in the last number of THE JOURNAL, page 225, I am quoted as saying, "The septic tanks of Lake Forest and Champaign are doing excellent work, but prove that the work must be under the supervision of competent engineers." Permit me to state that I referred in the discussion to the septic tank of Champaign as one which is not doing satisfactory work, although it is under excellent scientific supervision. On the other hand, I referred to the septic tank of Lake Forest as one which is working satisfactorily, in spite of negligence.

Thanking you in advance for your kindness, I am,

Yours very truly, DR. ARTHUR LEDERER,
Chairman and Bacteriologist.

## A RECENT VISIT TO THE SURGICAL CLINICS OF THE ENGLISH HOSPITALS.

The American physician is cordially received by his English brethren and a tremendous amount of surgical work may be seen in a comparatively short period after one has learned his way about from one hospital to another. In London the hospitals are so widely scattered that much valuable time may be lost before finding out the locations of the different ones and the hours at which operations are to occur.

I found last summer's experience more valuable than a similar one six years ago spent in Berlin and Vienna, for, while one soon obtains a good working knowledge of German, still he is bound to miss a good deal that would otherwise be helpful by not having an intimate acquaintance with the foreign language.

London is naturally the mecca for the American doctor in England. While many London surgeons are doing general surgery, a large number are following some special line. Sir Victor Horsley operates at the National Hospital usually at 9 o'clock. As students twelve or fifteen years ago, Sir Victor was quoted extensively in surgical lectures on the brain and cord, and it seems a surprising fact that he is still under fifty and has all the enthusiasm of a younger man. After his clinic at the National, which consisted of removing two brain tumors and one Gasserian ganglion, we made the rounds of the wards with him. He is very approachable and it is said of him that he will make an appointment for 6 o'clock in the morning to take up the discussion of some surgical problem. Sir Victor is also on the staff of the Chelsea Hospital.

Mr. Freer of St. Peter's Hospital, in Henrietta street near the Strand, can be seen Wednesday afternoons. He is a recognized authority on prostates and his own method of removing the gland through a suprapubic incision is used extensively by English surgeons. The incision is a small one, two or three inches in length. After the incision no instrument is used, but, with the forefinger of the left hand in the bladder and the corresponding finger of the right hand in the rectum, the gland is shelled out between the two fingers. The whole operation commonly occupies only five or ten minutes. He has gotten through in three minutes, but a difficult case may take an hour and a half. Mr. Freer sutures a large rubber tube into the bladder and irrigates the bladder twice a day. In four days this large tube is replaced by a smaller and the patient is allowed to get up as soon as the tube is finally removed, in eight to twelve days. His results under this method have been remarkably good in the class of cases with a relatively high mortality.

Mr. Arbuthnot Lane operates at the Great Ormond Street and Guys Hospitals. At the former, a children's institution, he does orthopedics and other operations on the young. His cleft palate operation consists in pushing back the intermaxillary bone instead of removing it; then bringing flaps from hard palate with the periosteum from either side and suturing them to the intermaxillary in front and to each other behind. It seems to pack the anterior part of cleft very full of tissue; but one is impressed by the ease with which the flaps are brought over. There is no

pulling or stretching. He uses very fine interrupted silk sutures and a tiny needle holder and a needle of his own invention. At Guys Hospital Mr. Lane does his general work. In fractures, necessitating a direct immobilizing, he uses steel plates with screws. He seldom wires bones and says that the plates become imbedded and do not need to be removed, and that they do not give any trouble afterward.

J. Bland Sutton, whose classification of tumors is well known, may be seen at the Middlesex Hospital, in Mortimer street, two afternoons a week, Wednesdays and Saturdays, at 1:30.

Mr. Barker, at the University College Hospital, is doing more work in spinal anesthesia than any other surgeon I saw in England and has good results with it. He uses a derivative of cocain. One case, only, out of rather more than a dozen went wrong—a carcinoma of the splenic flexure of the colon. The patient collapsed on the table and was revived with difficulty. Mr. Barker thought this was due to traction on the tumor, which he was unable to remove, but made an anastomosis between the transverse colon and the sigmoid.

Since the retirement of Sir Frederick Treves Mr. Mouillin is the senior surgeon on the staff of the London Hospital. This hospital, while a distance out in White Chapel road, East End, is well worth a visit. Mr. Moullin did a nephrectomy, removed an ovarian cyst and two appendices the afternoon we were there.

Mr. Gould at Middlesex, Mr. Godlee at the University College Hospital, Mr. Wallis at Charing Cross Hospital, and Mr. Berry at the Royal Free Hospital are skilful operators.

Mr. Mayo Robson, since coming to London, several years ago from Leeds, has received no hospital appointment, but operates at nursing homes. In London the positions on the staff of a hospital are arranged according to seniority and it is extremely difficult for a surgeon coming from another town to get on the staff. Those who do not are compelled to establish private hospitals or take their cases to the private hospital of some other surgeon; often several surgeons club together and establish an institution of this sort.

It is not necessary to present letters of recommendation. The writer overlooked at the last moment those that he had intended taking along and found that one's card given to the clerk will be handed to the surgeon and insures the visitor an invitation to enter. The clerk will also furnish all information as to the regular clinics and the surgeon or his assistant will send word to the visitor (on his giving his London address) the list of operations for the morrow and the hospital at which the work is to be done.

In the provincial towns of England the visitor sees a lot of good work, with the added advantage that, as a rule, it is not so scattered as in London, one main hospital taking care of the cases in a city of half a million or more people. The distances are so short and railroad service so adequate that, even in a short stay, it would be well to plan to go to at least some of these towns.

At Liverpool Mr. Jones is giving his attention largely to orthopedics. Formerly a general surgeon, he is now one of England's best orthopedists. He gives up one day a week (Sunday) to charity. Scores come on this day, beginning early in the morning. Cases are seen, diagnosed, treatment prescribed, braces and splints made, fitted and refitted, before the patient leaves the building.

At Manchester, Mr. Stanmore Bishop; at Birmingham, Mr. Gilbert Barling; at Sheffield, Mr. Sinclair White, are all capable men.

Sailing for England from Montreal, I utilized an idle day in visiting the general hospital there, the scene of Dr. Osler's early work, an institution of only about 100 beds in his day. So in England I made a trip to Oxford to see the present field of endeavor of this well-known educator. This is a town containing many beautiful colleges. The medical department is well equipped, and, while school was not in session, I made the round of the hospital and other buildings.

At Leeds, England, a town of 500,000, Mr. Moynihan and Mr. Littlewood have the major part of the surgical work.

Newcastle-upon-Tyne offers the visitor more to see surgically in a given time than can be seen anywhere else in England. The Royal Infirmary of 600 beds there is entirely a charitable institution, provided for by private donations, and draws upon the population in the town and the surrounding country of at least three-quarters of a million. During my stay 1,000 operations were performed, 400 a month. The most in any one day was 28. Four surgeons were operating at one time in one building on the same floor. It was, of course, impossible to see all of these, but the lists were posted and the visitor could make his choice. The general surgical nurse, who goes about from one operating room to another to oversee, was accommodating enough to inform me whenever an operation I particularly desired to see was being started in one of the other rooms. Visitors were given gowns and invited into the arena; it being summer and no students present, we had an uninterrupted view. All of the general surgeons do gynecology, ten beds only being in charge of Dr. Lyle, a gynecologist. A like number of beds are set aside for Messrs. Ridley and Whyllis, who specialize in eye, ear, nose and throat. Four surgeons, each with his assistant, have the remainder, and so great is the demand that operations of convenience are postponed until a vacancy occurs. The senior surgeon here is Mr. James Rutherford Morrison (general practitioners in England have the title "Doctor" and surgeons "Mr."). He uses the transverse incision in all his gall-stone and appendix operations, laying open the muscles far over on the loin. His breast operation, which is a modification of the Halstead, is a most thorough one, removing all fat and glands from the axilla, the supraclavicular glands, the chain of lymph vessels on the opposite side along the stermum, the pectoralis major and minor muscles, and the fascia anterior to the upper portion of both recti muscles. An hour and a quarter is about the usual length of time that is needed for him to perform this operation. His mortality is very low, and he attributes this to the fact that he keeps the patient very warm

on the table and has two assistants to check hemorrhage. So successful has he been that cases to-day, eighteen years after the operation, are free from any recurrence.

Mr. Martin is an exceedingly rapid operator and has done about two hundred operations on the knee for the removal of loose cartilages. He finds these cases most frequently in coal miners and football players. Only about 8 per cent. are external cartilages. Mr. Angus and Mr. Rutherford are the other two surgeons. Mr. Angus showed in a clinic a good collection of elbow joint cases, which had had a resulting ankylosis after fracture. He had resected the lower end of humerus and obtained a wide range of motion in all. The four assistant surgeons have each a certain number of beds and stated days for holding their clinics. Mr. Richardson has done considerable cystoscopy and removes vesical calculi swiftly and skilfully. Mr. Turner does efficient and clean operations on the neck, using a curved incision for removing tubercular glands. I saw Mr. Clay cut down on a kidney containing stones with the intention of doing a nephrectomy, but, palpating the other kidney through the incision, found it likewise affected. He removed five stones and brought the kidney outside to stop an obstinate oozing, leaving it outside for four days wrapped in dressing. In five weeks he performed the same operation on the other kidney, removing four stones. Mr. Leach is clever in hernia, doing the Bassini for inguinal and Parry's operation for femoral.

At the age of sixty comes the surgeon's retirement from the staff of this infirmary, and after this he frequently gives up the practice of surgery. The surgeons at Newcastle have private hospitals where operations on private patients are performed; only charity cases are allowed in the infirmary.

### GENERAL CONSIDERATIONS.

1. Many of the English hospitals have not the equipment of the modern buildings erected in America. Improvements, however, are being made all the time and the proverbial slowness attributed to the English in general can surely not be ascribed to her medical men.

2. About three-fourths of the English surgeons wear rubber gloves. Those who do not usually require their assistants to do so. The word has come to them from Germany, however, that many of the Germans have discarded gloves on the ground that the expense is great—that the results are no better.

3. More than one-half wear caps, but very few have a covering over the face.

4. Their asepsis is, on the whole, good. They do not have extensive scrubbing of the hands or of the patient before operating.

5. The antiseptics vary; turpentine is used on the hands, followed by alcohol. Biniodid of mercury, bichlorid and lysol are used to rinse the hands during operations.

6. Many operators wear rubber boots to protect the feet. The floors are damp, due largely to the practice still prevailing of washing out the abdomen, even in clean cases.

7. Some English surgeons do not change to an operating suit, and it is no uncommon sight to see an operator still wearing his street suit, minus the coat, even retaining his collar and tie, up to the end of a five hour clinic.

8. The nurses are well trained and capable; very painstaking and efficient in their work.

9. I was impressed with the high standard of the general practitioner in England. The lines are more closely drawn there and few general practitioners do even minor surgery. It was noticeable, though, that, when his cases came to the hospital, the family doctor had made a diagnosis that was later confirmed by the surgeon on the table.

10. It was an agreeable surprise to observe the speed with which the average English surgeon works. I frequently saw eight or nine major cases gotten through with in three hours of operating.

11. The medical schools are of a high order and each student must have given anesthetics to the number of seventy-five before receiving his degree. Most students give many more than the required number.

12. Anesthetics: Ether has come into vogue and is given by the drop method more than any other anesthetic in England to-day.

T. W. Curry, A.B.,M.D.,
Streator, Ill.

# COUNTY AND DISTRICT SOCIETIES

## COOK COUNTY.

### *CHICAGO MEDICAL SOCIETY.*

A regular meeting was held May 26, 1909, with the president, Alfred C. Cotton, in the chair. The subject for the evening was "The Abuse of Medical Charities and Its Correction." Papers were presented as follows: Medical Charity from the Point of View of the Patient," by Alice Hamilton, in the absence of Jane Addams, who was to have spoken on the subject, "The Sociological Aspect of Medical Charities." "The Ethics of the Present Movement," by E. A. Fischkin. "The Professional Aspect of the Present Movement," by E. L. Kenyon. "The Proposed Remedy, Its Feasibility and Its Disadvantages," by John M. Dodson. The discussion was opened by Alexander M. Wilson and continued by E. Wyllys Andrews, John A. Robison, R. S. Yarros, M. Malkin, Chauncey W. Courtwright, Charles A. Parker, H. E. Mock, L. Harrison Mettler and the discussion closed by E. A. Fischkin.

Dr. A. J. Ochsner offered the following resolution:

*Resolved*, That this meeting of the Chicago Medical Society heartily endorses the plan of the committee of the society for the correction of the abuses of medical charities, and recommends that the referendum vote in June on this subject be the largest ever given for any movement in this society.

The resolution was seconded by L. Harrison Mettler and unanimously adopted.

Adjourned.

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## MEDICAL CHARITY FROM THE POINT OF VIEW OF THE PATIENT.

ALICE HAMILTON, M.D., CHICAGO.
Memorial Institute for Infectious Diseases.

The subject of the abuse of medical charities has occupied us for several months now. We have had many papers and a still larger number of informal letters on this question by practitioners from all parts of the city and representing practically all classes of the profession. And yet, in all this wealth of discussion, I think that the side of the recipient—in some cases the victim—of medical charity, has not been adequately represented. For the last twelve years I have lived at Hull House, a social settlement in one of the great foreign quarters of Chicago, and I should like to present the question as it appears to those who live among the people who fill our dispensaries and free hospital beds.

There is no place better adapted to the study of "medicine as she is practiced" than a settlement. Our neighbors are necessarily among the victims of all the mistakes and crimes perpetrated in the name of medical practice in this city. If the State Board of Health is lenient in its standards of medical teaching, it is neighborhoods like ours that receive the half-educated graduates of inferior schools. It is our women who employ the midwives licensed to practice without any practical knowledge of obstetrics or asepsis. And it is our people who frequent the dispensaries, good, bad and indifferent, because they have no knowledge of how to distinguish the good from the bad. The County Hospital is recruited from neighborhoods like ours, and the feeble and inadequate provision made by the city for free medical care in the home is all that many of our people have to depend upon in periods of hard times.

In such a neighborhood one can study the various motives which impel the poor and the nearly poor to seek medical charity, and one can also observe the character of medical treatment which is furnished them in the name of charity.

The question, then, naturally presents itself to us in two aspects: First, how many people are there who are justified in asking for free medical care, and, second, what sort of care is now given to those who really need it?

The part of Chicago around Hull House is inhabited by Irish, Italians, Greeks, Bohemians, Poles, Germans and the various nationalities of Jews. The last named seek the dispensaries and hospitals of their own accord; the others are far less willing to do so. They usually prefer to choose their own physician and to pay him. Yet a very large number of these people also go to the dispensaries and free beds in the hospitals. There is no need to explain the motive that actuates the great majority of them, for it is simply poverty, and all of us are agreed that the very poor must continue to be treated as objects of charity by the medical profession. It is the others of whom I wish to speak, the independent poor, who do not seek any other kind of charity, except medical, and who can not with truth call themselves destitute. These are the people against whom is aimed the sytem of control by investigation proposed by the Committee on the Abuse of Medical Charities and endorsed by the vast majority of the members of the Chicago Medical Society.

At first thought, most people will say that a person who is not in dire financial straits, who can pay a fair fee to a physician, has no right to apply for free treatment, and yet if one looks below the surface, if one knows personally the people of this class and their past histories, one will be forced to say that many of them need free care and should, for the good of the community, receive it.

There are, in the first place, families, the number of whom has increased enormously during the last two years of hard times, who can maintain a proper standard of life only if there is no unusual drain on the family purse. For these people to continue paying doctor bills during a long period of time means that they must lower their standard of living, that they must cut off some of the necessities or decencies of life. The time comes when it is only wise and right for such a family to leave its physician and seek free medical care. Yet these people, for the most part, would refuse to do so and would go untreated if they knew that a visit to a dispensary meant an investigation by an agent of the United Charities. The same thing would be true of a large number of cases whom we are constantly urging to go to dispensaries and hospitals, those people who could perhaps pay, if the need were very great, but who do not feel justified in spending money needed for other things, upon medical treatment which is not absolutely necessary. Thus we find children with uncorrected errors of refraction, with adenoids and hypertrophied tonsils, with skin diseases, with chronic otitis media; all needing treatment yet able to do without it. A woman will suffer for years rather than subject her family to the expense of a pelvic operation and a sojourn in the hospital, so long as she can manage to keep up without it. It would seem that the good of the community demanded that such people should receive the care needed to make them healthy workers and yet not be obliged to lower their standard of living in order to receive it.

There has been much criticism of the free obstetrical dispensaries, which are said to rob the physician of the best part of his family practice. But if it is to the interest of the community that women should not die in childbirth, or recover with health permanently impaired, and that babies should be saved from ophthalmia, then we must have the obstetrical dispensaries. A large number of the people in our neighborhood can not afford to pay more than five or ten dollars for obstetrical services. There are midwives who will come for five dollars, there are physicians who will take charge of a case for ten dollars, but it is needless to say that no good physician can afford to give for that price the care that the woman really needs.

Finally there are people who can pay the fee usual in the neighborhoods like ours and who are accustomed to do so, people who are perhaps among the best paying patients in the practice of our neighborhood doctors. I have myself, as have many Hull House residents, urged some of these people to leave their doctors and to go to some good free clinic, as I feel sure you would all do if you were in our place. These are the victims of the ignorance and carelessness of our pro-

fession; the people with serious organic troubles who are treated for months by physicians too hurried or too unskilled to make a proper physical examination and discover the real nature of their ailment. I can not tell you how many cases of incipient tuberculosis and how many cases of advanced tuberculosis the dispensaries have discovered for us among people who have wasted months in futile, inappropriate courses of treatment. Such people could not pay the fee of a first class man; they could not pay for an examination of the sputum, blood, urine, etc., yet no one can deny that they need it, and that a system of control which made it impossible for them to enter a dispensary would be at fault somewhere. In this connection I might perhaps speak of another objection to the plan of the Committee on the Abuse of Medical Charities, and that is, the extreme difficulty of carrying it out. The very poor, who are already on the books of the United Charities, would present no difficulty, but the other classes mentioned above would call for a very skilled and tactful corps of investigators. It is comparatively easy to say how much of the family income should be expended for rent, fuel, food, etc., but it is a very different matter to decide whether the expense of an illness or an operation can or can not be borne without a disastrous lowering of the family standard of living.

When we come to look at the plan in its effect upon the character of medical care furnished to the sick poor, we are told that it will improve this by lessening the over-crowding now admittedly present even in our best dispensaries. Granting this, an undeniable improvement, there seems to be no other way in which the plan would benefit the poor, no other abuse which would be corrected. I can not agree to the statement that a strict investigation would to any extent help the over-crowding of the County Hospital. Perhaps it is different in other parts of Chicago, but certainly in our part of the city nobody goes to the County Hospital who can possibly go anywhere else, the reason for their unwillingness lying in the over-crowding with the resulting inadequacy of nursing and medical care. Nor does the plan provide in any way for that great need in our city—a system of out-practice among the poor. If, as we all admit, there are people who need care in the dispensaries, there must surely be people who are too sick to visit them and who need the care in their homes. All that the plan would accomplish would be to lessen over-crowding in the dispensaries, but it would do this in many cases at the expense of people who should be encouraged to come instead of being sent away.

It may seem that we are very arrogant to demand, as we apparently do, an amount of charitable service from the medical profession which we would never think of asking from any other profession. Perhaps the reason for this lies in our feeling that the free service furnished by physicians is not entirely charity, that men are prompted by an enlightened self-interest to seek positions on the staffs of dispensaries and hospitals, and that the patient is not only a recipient of charity, but a useful and necessary adjunct to the training of medical practitioners. And if we follow out this very well founded theory we may arrive at a quite different plan for the control of our medical charities, one which will correct the abuses of, as well as by, the applicant for such charity. If we take up the question of medical service in relation to our system of teaching medicine we see at once that it is an indispensable part of the latter. We have not, however, in this country, put our poor patients to anything like their proper use in this respect. Our graduates must still go to Europe in order to see a large amount of clinical material and our schools are still subject to the severe criticism of Europeans because of our inadequate clinical facilities. It would seem, then, that instead of crying out about our free hospitals and clinics and denouncing their over-use, we should encourage them in order to give medical students and recent graduates the experience they need. To do this, all of the free medical care now furnished should be carried on in connection with and as a part of the teaching of medicine, not only the dispensary work, but, what is even more important, that furnished by the hospitals. If every free case, in- or out-patient, is used for study, then we need have no scruples as to pauperization, as to giving for nothing that which should be paid for. The patient will pay, in that he will

serve as material for clinical teaching. Perhaps even more valuable to the student than dispensaries and hospitals would be a well controlled system of out-practice among the poor, conducted by the medical schools and offering the student an opportunity to learn what hospital practice alone can not teach him. Anyone who is familiar with the free medical care now furnished in our city will agree with me when I say that such a plan as this would result in an enormous improvement in its character. If we are to give the poor medical charity at all, it should certainly be of high character, and this is possible on a large scale only when the institution furnishing it is used for teaching purposes. It is not only that a class of students acts as a spur and a stimulus to the clinician, but also that he can combine in this way the time devoted to teaching with that devoted to his free hospital cases. If the Cook County Hospital were freely used for bedside clinics we should, I am sure, hear far less criticism of it from ex-patients than we now do.

In pleading, then, for a new attitude toward the so-called abuse of medical charity, we would appeal, not so much to the sentiment of pity as to the enlightened self-interest of the profession. We would urge them to make all possible use of the free patient, except for pecuniary gain, knowing that in this way the interest of the patient himself will be best served. Instead of deterring people from seeking medical charity, we would demand from those who do seek it an equivalent of service by requiring them to act as subjects of clinical study. Overcrowding in the dispensaries would be corrected, not by refusing applicants, but by increasing the number on the staff. It seems absurd to send patients away because the clinicians are too few to handle them properly, while there are dozens of applicants for places on the dispensary staff, all of whom need the experience which is now being wasted.

Were I to outline a rival plan to that of the committee it would be as follows:

1. A stricter policy on the part of the State Board of Health which would result in closing the inferior medical schools, and in refusing licenses to untrained midwives, for the applicants for medical charity are in part recruited from the victims of malpractice.

2. Limiting free dispensary service to that conducted for teaching purposes by accredited medical schools.

3. The enlargement of the staffs of such dispensaries, until each clinician is expected to handle only a limited number of patients.

4. The institution of a system of out-practice among the poor, carried on by the medical schools as a part of their curriculum.

4. And, finally, the admission of students and instructors to all the wards of Cook County Hospital and to the free wards of private hospitals.

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## THE ETHICS OF MEDICAL CHARITIES IN THE PRESENT MOVEMENT.

E. A. Fischkin, M.D., Chicago.

The present movement to regulate the conduct of the medical profession in the way of dispensation of its charities, though started, apparently spontaneously, within our society, is not confined to Chicago, not even to America. It is now universal. It is being agitated among the medical societies of Germany and Austria; it is, as stated in a recent letter to *The Journal of the American Medical Association*, now the burning question of the day for the physicians of Paris, and is there nearing its solution. It is a universal movement. For ethics is the child of universal want. The more general and widespread the want and the need of a people, or of a certain class, the more intense is its desire for a new way, one higher in its ethics. For ethics means dissatisfaction with the present state of things, it is the attempt to improve, to reform, to find a way out of conditions which became unbearable.

Medical ethics may therefore be defined as a general longing for deliverance from conditions which became intolerable a universally felt desire for improve-

ment which is turned into a demand. Medical ethics has ceased to be mere medical etiquette.

The present movement for regulation of medical charities is pre-eminently ethical, because it seeks to eradicate evils which are universally recognized, because it tries to remove these evils not for the sake only of its own material benefit and economic advantage. Let it be said at the outset that the present movement is not an attempt to improve our economic condition by throwing off the burden, which is as old or older than Medicine itself; it is not an effort to curtail medical charities. Through the nature of our calling, or the effect of our education and training, the necessity to sacrifice our time and skill and often our strength and material interest at the altar of charity is felt by every reputable physician. Charity is a cardinal virtue of medicine, it is inherent in our calling, and to paraphrase the words of Voltaire, one might say, that if there were no opportunities for the exercise of medical charity it would be necessary to invent them. What the present movement tries to accomplish is not to abolish our unselfish Samaritan duties, but to purify them from degrading influences. It comes not to destroy, but to fulfill. It intends not to lower the standard of medical charities, but to elevate it, to lift its administration to a higher plane of responsibility and of justice, to eliminate the possibilities for its misuse and abuse, to put it on a more ethical basis.

Medical charity, in the loose disorderly manner in which it is managed now, is grossly unethical. For medical services, rendered under the lofty claim of charity, must have no motive of self-interest behind it. True charity must rise above personal consideration. Disinterestedness is the only test which gives it an ethical quality and lends it moral worth. But medical charity, as it is now administered, is divested of all ethical qualities, for it serves as a means to a dozen ends and stands in relation to a number of interests, which all try to use it to their own advantage. The society which makes the management of a dispensary or a hospital subservient to the interest of its church, the hospital which makes use of the charitable service of its medical staff in the interest of its finances, the college which throws its doors wide open to the public in the interest of its teaching facilities, the physician who gives his services indiscriminately in the interest of his own development and of his reputation, they all make the medical charities of to-day unworthy of its name, being unethical in their motives. And being immoral in their motives, they can not have the moral power to restrain other interests from preying upon their work, and the result is the most fragrant abuse of charity by people who have no claim to it, and the most inglorious defeat of the ends of charity.

The loose, disorderly way in which our charities are managed, the lack of moral obligation on the part of those who seek to participate of their benefits, the absence of moral order in its administration, by necessity results in the lack of moral discipline and the absence of moral responsibility on the part of those who administer the charity. The most vivid and strongest impression gained by impartial observers of our charities is that produced by their inefficiency, the recognition of their poverty in positive, beneficial results. The most severe condemnation of the present administration of medical charities and the most humiliating, by its reflection on the medical profession, is the complaint of the charities organizations that their charges, the deserving poor, whom they are sending to the dispensaries for relief from their ailments, are getting no relief; that often a poor woman, to quote them verbally, who applies to them for help, brings as a proof of her disease five or six prescriptions, which she has collected from different dispensaries, without any visible improvement of her health. This inefficiency of service is the main reason why these charity organizations are willing and anxious to lend us their material and moral forces for the attempt to reform the administration of medical charities, in the expectation to raise their efficiency. "My personal feeling," says Mr. Kingsley, in his communication to *The Bulletin*, "is that the dispensaries and hospitals are themselves responsible for the abuses that have developed. They have no check or balances which would reveal to them the necessity and efficiency of their work."

Our own dignity and the honor of our science put upon us the ethical obligation to effect such a reform and to remove the most active causes which go to discredit the profession as well as the medical science. For there is no doubt that the growth of quackery and of all kinds of modern medical charlatanism, of which we have so much reason to complain lately, is due to a great extent to the disappointment of the great masses, the habitués of our free dispensaries, who alone are the supporters of the considerable army of medical fakers and who fall an easy prey to their allurements, after they have been disappointd by what they took to be promises of medical science.

The regulation of our medical charities and the introduction of a moral order into our institutions may therefore be regarded as a moral duty which we owe to our profession and to our science.

And there is yet another ethical aspect to the movement. The abuse of the medical charitable service by institutions, the flagrant misuse of this charity for persons and for interests, which can have no claim to our free service, is such an insult to our self-respect and an indignity to our intellect, that we are in duty bound to resent it. Ethics means in a certain sense the assertion of ourselves. Self-respect is the first duty of personal ethics. But there is no more lamentable deficiency of personal ethics than the lack of self-assertiveness which physicians show in their relation to institutions which rely entirely, almost exclusively, upon them and their service. This lack of self-assertiveness can not be compatible with a high feeling of responsibility. He who questions that there is a duty to himself is liable to question sooner or later whether there be any real duty to others, for others are only human beings like himself, and the physician who permits lay administrators to exclude him from all participation in the control of his own work, who permits them to waste his noble efforts and his humanitarian sympathies on the unworthy, without raising his voice in protest and without demanding full power to regulate his own charities, is hardly conscious of his own humanity.

The regulation of medical charities is also a moral duty which we owe to society as well as to ourselves. The crowding of people, able to pay, into the free dispensaries and hospitals not only deprives the real poor and deserving patients, for whom alone these institutions are built, of their chance to get relief, but, as has been pointed out so many times, works a moral injury to those imposters themselves and to society. For no person can receive for nothing services for which he is able to pay without moral deterioration, and the presence in the community of such persons, preying on public charity, has a tendency to tempt others to sink to their degraded level.

And last, but not least, there is the ethical duty which institutional physicians owe to the profession at large, to the general practitioners, from whose clientele the able-to-pay patients are recruited, and whose practices are undermined by the drifting away of these patients. There is a logical consequence in the fact that 25 per cent. of the population of Chicago are receiving free medical aid, a fact responsible, to a certain extent for the reduced economic conditions of the physicians of this city, of whom, as is claimed, 50 per cent. can not afford to pay $10 for inserting their names in the telephone book. The institutions, who derive a benefit from their public clientele, the institutional physicians, who increase their skill and advance their reputation by this public practice, will soon be forced to recognize at whose expense they are promoting their own interest. Justice will demand that the right which the physician has to his practice be respected, and that his honest service, which he is ready to render to his patients, and which his patients need, shall not be beaten down by competitors who care not for useless and ruinous waste.

The "right to practice" and the demand that it be respected will become the watchword of medical organizations and the central idea of their code of ethics. It will become a demand which no institution, no matter how strong in influence, will be able to ignore, no physician, no matter how independent in action, will be able to disregard, for at its basis lies the principle of justice, and a united profession stands at guard.

DISCUSSION ON THE ABUSE OF MEDICAL CHARITIES AND ITS CORRECTION.

Mr. Alexander M. Wilson:—Dr. Dodson has said so very well what I intended to say that there is very little left for me to add in the way of discussion other than to endorse what he has said.

I find in looking at the program that I represent the Bureau of Charities. There is no longer any Bureau of Charities in the city of Chicago. Happily, the Bureau of Charities has consolidated with the Relief and Aid Society, and now there is one united society representing the non-Jewish people of the city of Chicago to which doctors and others may refer the needy for charitable help. The plan we developed the past winter in conjunction with the Chicago Medical Society can now be operated much more systematically through the United Charities. I am speaking to-night instead of Mr. Kingsley, the superintendent, who has been called out of town, but I assure you that the new society will go on with the plans as we have worked them out, very much on the lines Dr. Dodson has described to you. The United Charities will maintain a registration bureau where it will file all cards sent in by the dispensaries. These cards will give a certain amount of information, and in filling them out at the dispensary it will be possible to determine on the spot, in most instances, whether the patients are able to pay for treatment or whether they deserve free treatment. In doubtful cases the United Charities Society will determine whether these people deserve free treatment or not.

There is a new development in one section of the city that you may not be familiar with. It is worth describing briefly, as it throws a rather interesting sidelight on some of these questions. The United Charities has worked out, with the aid of physicians of South Chicago, a plan for the free treatment of people far removed from the free dispensaries. With the South Chicago branch of the Chicago Medical Society our society has agreed upon a plan of having the doctors of that branch take turns in giving free medical service to people who have been previously investigated by our agents. The churches and the various social agencies report their cases needing free treatment to our office, which in turn calls upon the physician on duty that day. The doctors in that part of the city, without having established a free dispensary, are giving to the poor of that section free medical service and the possibility of abuse is entirely obviated.

Dr. Wyllys Andrews:—Nothing I say, I am sure, can add to the impressiveness of the words we have heard this evening from the different speakers, coming, as they do, from people directly in personal contact with the poor of this city, who are most concerned in this question.

It occurred to me, as I listened to the discussion of the needs of the poor people and their bearing on the duties of the medical profession, that part of this problem is due to a change, an evolution both in the relation of professional men to the public and to hospitals. We have only to look back a few generations to practically a feudal status of professional men. I am informed that until the present generation, no physician in the old country or in England, at least, could collect a medical bill by law. Such services were paid for by an honorarium, or, if translated into modern terms, a tip. Probably all professions were about on a par under the feudal state of society out of which so many of the present poor of Europe have come to our shores. It would not please a man who earns his living by his pen to be compelled to live in the state of public appreciation of the time of Byron, for I read only to-day in a review that then it was considered beneath the dignity of a poet or literary man to charge a sum of money for his work.

The state of the public mind towards hospitals is also changing, for it is only within the last twenty years that the well-to-do would go to a hospital at all. We can all remember the time when the suggestion to go to a hospital would probably have been met with the remark, "No, I am able to pay; I won't go to the hospital; only paupers go there." The prosperous people were always treated in their houses. To-day well-to-do persons prefer to go to hospitals, where we see the two systems overlapping and conflicting. It is due to these tendencies

holding over from the past that we have some of the embarrassments which we are considering, so that the educational value of this movement, both towards ourselves and the public, is one of its most important aspects.

It is unnecessary for me to emphasize the importance of the resolution which is before this society in the form of a referendum. Every one who took the trouble to read carefully the well-prepared report in the Bulletin stands ready to cast a favorable vote for its passage. It is admirable in that it does not go too far. It takes one safe step at a time. It puts us now in the position of correcting, first, the dispensary abuse, purposely leaving for the next step the correction of hospital abuse.

I agree with Dr. Kenyon that we abate our finer sense of duty towards the poor whom we are helping when we learn that we are imposed upon. Personally, I have not only given time, but a certain amount of money more or less regularly for such work. I can not conscientiously say that I do my best for poor people if I am in the frame of mind of feeling imposed on. If any one here is not prepared to vote for this particular resolution let him read it up. I want to urge every member of the Chicago Medical Society that, when the election takes place, he vote aye in the referendum.

Dr. John A. Robison:—The question before us to-night is familiar to you all, and it is hardly necessary for me to add a word in regard to the necessity of taking favorable action upon the referendum. I want, however, to second Dr. Andrews' remarks in urging you to vote for it.

I think the first speaker of the evening, Dr. Hamilton, struck the nail on the head in two or three particulars. In the first place, in regard to the inadequate service which the deserving poor receive from physicians who are in their own district whom they naturally consult. That is something that we as a medical organization can help to correct to a large extent, and it occurred to me while she was speaking that possibly this society might help her in one difficulty, and that is the difficulty she stated they met with in regard to the treatment of these deserving poor at their own homes. We have now fourteen branch societies. These branches are scattered all over the city, in fact, almost all over the county, and it has occurred to me that this committee, which has taken up this question, might not only work out a plan whereby the profession will be saved the embarrassment of imposition by people who are frauds, but they might best work out the problem of how to care for the deserving poor in their own different districts in their own homes, and the plan that has been mentioned by Mr. Wilson which has been instituted in South Chicago might be followed throughout the city. That is, that the different branches might appoint physicians who will be willing to give a certain amount of their time and services to the deserving poor in their own districts, if notified by the United Charities that the individuals in their district needed care. That would enable the rank and file of the profession to learn very soon who are the deserving poor.

It seems to me, in considering the abuses of charity, which touch the pocketbooks of the profession, that the number of able-to-pay patients found in dispensaries is small. The able-to-pay imposters are, as a rule, the patients who go to the hospitals, and we have been promised after trying this plan of work in the dispensaries for a year or so that the committee will then extend their labors and try to protect the profession from imposition by able-to-pay hospital patients. I would suggest it would be just as good a plan to do this at present as at any other time, because I believe the hospital is the place where the greatest imposition is practiced. I know, everyone knows, that there are very few hospitals in Chicago who make any attempt to protect physicians, not only physicians who are attending physicians to those institutions, but outside physicians, by not receiving patients in free or endowed beds who are able to pay. I have been connected with hospitals for a great many years, more or less, and have been imposed upon and got no help from the hospital management. I have been connected with one hospital for a great many years, and I have tried time and again to get the Board of Managers to institute a method of safeguarding the ad-

mission of patients who are able to pay to endowed beds by having the examining physician take the history of the case, the names and addresses of the parents, brothers, sisters, occupation, ability to pay, etc., and then have the hospital notify the physician that this or that patient is able to pay the attending physician or attending surgeon, but I have never been able to get them to do it.

The plan of the committee which is proposed is an excellent one. It seems to me, however, it might not be a bad idea to consider the plan which is adopted in London, which might be operated in conjunction with the present plan. The abuse of medical charities in London became so bad that the better hospitals there were compelled to establish an organization. This organization is called The London Hospital and Dispensary Reform Association. It is composed of three members from each hospital and each dispensary. This association met together, combined themselves together, and agreed that each hospital and dispensary which belonged to this association would employ a registrar. The duty of this registrar was to take the names, addresses, etc., of people and find out the financial condition of each patient, and if there were any patients able to subscribe twenty-five shillings per annum to the hospital they were refused free treatment. I believe it would be a good plan for all the medical organizations in Chicago, the Chicago Medical Society, the Homeopathic Medical Society, and the other societies, to combine in the formation of such an organization. We might call it the Hospital Reform Association, and work in conjunction with the United Charities, to see that the movement we are contemplating is carried out.

There is one point which perhaps I should not touch on to-night, as it was hardly contemplated to carry these reforms into the hospitals at the present time, but I shall speak of it because I have noticed it so frequently, and that is this: Why are hospitals so anxious to have endowed beds? It is one of the greatest drawing cards a hospital may have to be able to print each year how many days of free treatment they have given patients. I think it was Sir William Thompson who said, "The best way for a hospital to raise money is to be continuously in debt," and I am quite certain that I make no misstatement when I say that every general private hospital, except those hospitals that are run for pecuniary profit, are in debt every year. They have a large debt every year, otherwise there would not be any necessity for the hospital begging money each year, and the larger the list of free patients the greater the excuse for going out and asking people to give them money. I know one hospital that has treated many free patients, and until two years ago it had a deficit each year amounting to from twelve to fifteen thousand dollars. That same hospital has a number of endowed beds. They have one or more endowed beds which have been endowed by one of the wealthiest corporations in Chicago. When any of the employes of that corporation become ill and wish to go to this hospital, all they have to do is to apply to the proper individal of the corporation, and they are sent to that endowed bed. I know some of these employes have been drawing salaries ranging from fifty dollars to sixty dollars a week, and have received free treatment at that hospital. Is that right? (A chorus of voices, "No.") That is a point I wanted to bring up.

The profession should protect itself. I am in perfect accord with the sentiment that we should take care of the poor sick. The medical profession has always stood ready to take care of the sick poor and those who are unable to pay. The profession is ever ready to take care of people who have only slight means. They are willing to give the best of their services, and I do not believe there is a physician here but who is willing to do the best he can for any man whom he believes is honest. (Applause.) But we will turn him down every time if we think he is trying to defraud us. That is right.

Dr. Andrews spoke of the evolution that is taking place in the practice of medicine. Times have changed in the practice of medicine, and I do not believe we can any longer pose before the public as philanthropists, pure and simple. We have to make our living, and the better living we make, the better income we make, the better we can equip ourselves for treating the sick. If we are to be worried or bothered by this, where am I going to get enough to pay my

butcher's bill or grocer's bill to-morrow? we naturally can not give our patients the best services. The laborer is worthy of his hire, and if we give people good service, for goodness sake let us have what is due us. (Applause.)

Dr. William H. Wilder:—There are three classes of poor, the Lord's poor, the devil's poor and the poor devils. It is important that we differentiate them very carefully. What I have to say I want to say from the standpoint of the institutional man, because a good part of my professional life has been spent in clinical and dispensary work, and having had considerable experience in it, and having made some observations, I have arrived at some definite conclusions.

Before touching on one or two points I want to bring up, I wish to consider some of the ideas that were presented by those who read the papers. I quite agree with Dr. Hamilton in almost everything she said, but I wish to take exception to one statement she made that might be construed as aspersion against the profession, and that is in regard to mistakes that members of the profession make in their dispensary work or among poor patients. If blunders are committed because state boards of health or examiners pass incompetent practitioners, it is not the fault of the profession, but rather the fault of society at large. When society demands higher class physicians, society will get them, and not until then. The medical profession is doing all it can to raise the standard of its work, and we are not met half way by society, as those of us know who have engaged in the work of trying to elevate the standards of medical requirements. We go before legislative bodies with the public welfare at heart and are confronted by the criticism that we are doing it for self-interest.

Another point against which I want to protest is that we as physicians owe our services to the public at large to treat the sick poor. That old idea is exploded. We do not owe our services to the public any more than do any other class of citizens. The department stores clothe the poor. Do they reduce the price of fancy headgear or nice wearing apparel in which many of our patients are arrayed when they appear in our clinic room to consult us? Not one cent. It is no more our *duty* to treat gratis the sick poor than it is the duty of any individual to give something for nothing. This is an economic proposition. (Applause.)

With this proposition in mind, let us consider how we go about our work in dispensaries, and what are our motives. In the first place, they are free dispensaries without teaching facilities, and in the second place there are dispensaries conducted as institutions to furnish material for teaching purposes. As Dr. Hamilton has so well stated, it is to be hoped the time will come when all medical charity will be dispensed in dispensaries of the latter class. She gave reasons for that in an excellent way.

When a physician connects himself with a dispensary or any clinic, why does he do it? Is the motive one of charity? Let us disabuse our minds of that. If we analyze our own thoughts we all know well we do not go into a dispensary or clinic with that high altruistic motive that some people would say we did. I am sure we must confess to ourselves that we do not do so. (Applause.) We go in just exactly for the same reason that we do many other things in life, namely, because of self-interest which lies at the bottom of nearly every motive and every deed, and we go in expecting a *quid pro quo*. The individual, in connecting himself with a dispensary or clinic gains skill and experience. He gets acquainted with students, and it matters not whether he goes to a clinic or free dispensary, he expects to get a reputation and something out of it and his ambition is a laudable one. Now, while this work is gratuitious it is not for this reason charitable, so far as the physician is concerned, for his prime motive is really a selfish one, but, if this physician is the right sort of a character, he will throw into his work a lot of charity and good will, which he often does, the opportunities being so abundant.

I am heartily in accord with this movement because I see a great deal of abuse of medical charities. I am connected with a large institution, the Illinois Charitable Eye and Ear Infirmary, where we repeatedly have gross impositions practiced, and it is not an uncommon thing, gentlemen, to have well-to-do pa-

tients come into the institution trying to get free services because they have heard of the reputations of the surgeons in that institution. A confrère of mine operated for cataract on a gentleman from down the state, who was worth sixty thousand dollars, who had managed to get into this institution for free treatment.

It is clear that such impositions as these work a great hardship and injustice to the non-institutional physicians and to the profession at large, and no one should be more willing to try to check the abuse than the dispensary or clinic physician.

Allow me to call your attention to one other point. It is not the institutional physician alone who is to blame for these abuses. Those of us who are working in dispensaries will unite gladly in any effort or movement to stop such imposition. But let us not lose sight of the fact, too, that the non-institutional physician is sometimes to blame, and not infrequently. This thing must have been observed in the experience of every physician engaged in dispensary or clinic work, namely, that some outside or non-institutional physicians will send patients into these institutions to get free treatment or advice who, they know, can afford to pay fees and whom they should send to the consultant or specialist. Only a week ago a man drawing two or three hundred dollars a month was brought into my clinic by a non-institutional physician to get free advice and treatment. Under such circumstances, must not the non-institutional physician accept a certain amount of blame for the abuse of charity in dispensaries?

Dr. R. S. Jones:—Dr. Wilder stated some of the facts as I see them, and to further emphasize one point I wish to state that at the end of sixteen years of dispensary work I am more indebted to my dispensary patients than they are to me. This, I am sure, is equally true of most men in the profession who are occupying hospital and dispensary positions. That our profession has its noble sides nobody can deny, but when we make ourselves and the laity believe that we do dispensary and hospital work entirely from altruistic motives we misrepresent the facts. Every honest physician will admit that he does not accept a hospital or dispensary position because of the benefit that he will confer upon his patients but because it is of infinite value to himself personally in many respects. But such selfishness is not to be deprecated; if he does good work he is not the only beneficiary. Hospitals and dispensaries which are conducted for teaching purposes are certainly not pure charities, and it is hoped for the sake of the patients and the students that most of the free medical work will be conducted in the near future for such purposes.

As to the argument that we are pauperizing people right and left by giving them free medical aid, the fact that so few of these patients that come to dispensaries are on the list of other charities shows that it is a fallacy. Indeed, I contend that by giving them free medical aid we frequently keep people from really becoming incapacitated for work. In other words, we keep them from becoming benficiaries of other charities.

As to the plan to restrict medical charities, the discussion of the subject has certainly been of great benefit to us all. It has made us realize more fully our responsibility to the patient, to each other, and to the public. But I doubt very much that the methods proposed will work. It will be almost impossible to get the right kind of investigators. The problem is far more complicated than it seems at first sight. For instance, take the obstetrical dispensaries. Formerly almost all the poor and a good portion of the middle class of women were taken care of by midwives, with great mortality to mother and child. In the last few years a good deal of this work has been done by the college dispensaries for the purpose of instruction, with great benefit to the patients and infinite value to the students. A great many of those patients are in a position to pay some money, but not a sufficient obstetrical fee to secure a competent physician and nurse. Should we refuse to take care of these women, send them back to midwives and take away the absolutely necessary instruction from the students?

Should you decide to investigate, if it is not to be perfunctory and therefore valueless, many experts will be needed. The charity organizations in question already spend all, and more according to some, of their money for investigations.

You certainly can not get much support from the physicians. As to the general public, you can hardly arouse enthusiasm for large schemes of investigation with the minimum of aid.

Dr. M. Malkin:—The problem that has been presented to-night is a very timely one. I have one thing in view which I wish to present to the Chicago Medical Society, and that is this: At the time I attended a hospital in Berlin I noticed the administration there was conducted in a very business-like manner; that every patient who presented himself for free service or otherwise had to sign an application. This application was brought to the administrator and the administrator saw that the patient was able to pay or not. But there is no such thing as entirely free charitable service in the City Hospital work in Berlin. Each individual has to pay a certain amount of money in accordance with his ability. Some pay only twenty-five cents a month, others fifteen cents a month, but their idea is not to entirely pauperize the community, and in this way, in order to retain good citizenship, they make every individual pay according to his ability.

Dr. Chauncey W. Courtright:—I did not hear the early part of the discussion, but I would like to make a few remarks in connection with what I have heard of the proceedings. Somebody has classed us as "general practitioners" and "the rank and file of the profession," and it seems to be forgotten that we, "the rank and file," are on the firing line of professional work; the ones who are fighting the battle. We do not forget nor neglect our charity work. We do it every year, and we do not get any advertisement from it that we know of. I wonder if it would not be much better to have a greater number of obstetricians among "the rank and file" of the profession than to have one person, who poses as an obstetrician, and has a great many dispensary patients, and acquires such great proficiency (?) and a wide reputation, which pays that individual so very well? It seems to me the "general practitioners" should get the benefit of some of that material and experience, each doing his share, and then we would have a *lot* of obstetricians and other kinds of specialists amongst "the rank and file" of the profession. I doubt if four or five good specialists, in any department of medicine or surgery, in a big city like Chicago, can do all the work and entirely fill the bill, big as they may grow. (Applause.) Now I am going to give you a little of human nature. I was born that way, and when I talk I have to say what I think.

Dr. Wilder has told us how he has seen the well-to-do patient come to the hospital, having been sent there by an outside physician, *for free treatment*. Yes! Certainly! When I have had a patient who was able to pay me a reasonable fee for operation or treatment and he has been drawn away from me by the stronger draught of some well advertised man, some institutional man, whose reputation had grown great because of his institutional connections, and I have lost that patient's business, and I have known the institutional man to collect a big fee, whereas I never got my money for past services; in fact, so much money being paid this great man that there would not be any money for me for treating that patient for two or three years; when such things as *that* occur, I remember them (A voice, "And so would any one," followed by loud applause), and the next time I get such a patient, under like conditions, I remember the institution with which such specialist is concerned, and *send the case to him at that institution* and let him treat the case *for nothing*, as I had to do in the previous case. (Applause.) But *that* is *one phase* of this great question.

Dr. Charles A. Parker:—I have very little to add to the discussion of this subject. It seems a little trite to say, after all, that we have only two parties interested in this affair, the patient and the doctor. The patient is trying to get all he can for nothing, and the doctor is trying to get all he can.

Dr. Wilder struck the keynote, in my judgment, when he said that no one has any more right to go to a doctor and expect charity service than he has to go to the grocer for groceries and expect the grocer to give them to him free. It seems to me, in going to a dispensary every patient should bring a document showing whether or not he has a right to charity. (Applause.) Of course, when

we get to the other side, the doctor's side, it is a tough proposition, and particularly the doctor in the hospital, and the part he plays there. There must be some way of preventing too much charity in the cases of well-to-do patients in hospitals, and I do not feel able to discuss that phase of the subject.

Dr. H. E. Mock:—I want to say a word or two in regard to the relation of our county institutions to the profession. Not so long ago, when I was an interne at the Cook County Hospital, I had the opportunity there of seeing our best surgeons on the attending staff treat patients who were sent in by this or that county commissioner, or by some other man with political power, free. A number of these patients in the free service were better off in reality financially than the surgeons who operated on them. For instance, one of our great politicians, a man who has recently stepped into a prominent position, had some of his relatives in this institution as patients, and one of the best surgeons operated on one of these. Nurses were furnished to this patient, all of the service being free, and yet the attending staff of the Cook County Hospital stood by and didn't say a word about this. To more or less of a degree they go ahead and allow these abuses of practice to continue.

It seems to me, while our committee is working on this subject of dispensaries, some method should be adopted to cut out this political practice in our county institutions. I bring this up to reinforce the statement brought out in regard to the proper control of dispensaries, because the interne has an opportunity of seeing these abuses practiced upon the profession. (Applause.)

Dr. Wyllys Andrews:—May I say a word, out of turn, apropos of the remarks by the last speaker? The abuse which he mentioned existed in the County Hospital up to about a year ago. We have all seen political influence bring well-to-do people into that institution, who chose their nurses, selected their physicians, and were put in a ward by themselves, taking all other patients out. I am referring now to patients of families that are well-to-do. These people should be made to feel ashamed of their use of political "pull."

Dr. Baum, president of the County Hospital staff, assures me that the president of the County Board has given him positive assurance that no patient shall now be taken care of in the County Hospital who can be shown to have means, and no physician of the staff will be compelled to attend such a case. During the current year a very stringent new requirement for admission was put in force, whereby no physician on the staff can assign a patient to his own or anyone's else service; neither can the Warden assign a case to any one physician on the staff. The anomalous state of affairs which formerly existed is being amended. I hope the next move of our excellent committee will be against the hospital abuse. No doubt public money has been wasted and physicians injured by public as well as private institutions.

Dr. L. Harrison Mettler:—I wish to second very heartily the resolution offered by Dr. Ochsner, and while on my feet to state my own feelings on this subject. The medical profession seems at times to be fearfully afraid of being considered uncharitable if it does not give its services gratis whenever it is asked to do so. As a result, the whole matter of medical charity has become sadly mixed up with a lot of maudlin sentimentality. Now, it is my observation that, class for class of citizens, there is about as much charity manifested in other walks of life as there is in ours. I am speaking of real charity, and say what I do most advisedly. Charity is largely a matter of individual temperament. It is a trait of character in its manifestation. It is not a particular qualification of any profession or calling. A shrewd business man may exhibit a most charitable instinct while a learned clergyman may be anything but genuinely charitable. Though we of the medical profession are fortunate in being able to exhibit our charitable traits by personal service, that does not lessen by comparison the splendid charity exercised by those in other walks of life in the giving of their money, building institutions of learning, and contributing to philanthropic schemes of all sorts. I do not think that we as a profession can claim so great a superiority in this respect. Indeed, I suspect that the world has smiled a bit at us now and then for making too loudly such a claim.

On the other hand, I say we aim far, and are entitled to full compensation for services rendered. Not only are we entitled to compensation for all of our medical services, but there is not one of us who, except in cases of emergency and absolute need wherein charity is provoked, no matter what the calling, does not act up to this belief. As has been said here to-night, we hold clinics, join hospital staffs, not for a money consideration, but for compensation in the way of experience and legitimate advertisement. The community receives benefit, to be sure, from the increase of professional skill, but it can not honestly be said that we as a profession and as individuals receive no benefit other than the exercise of self-sacrificing charity. The laborer is worthy of his hire, and we recognize that our labor in the maintenance of the health of the community deserves compensation of some sort always. We are not under obligation to give gratuitously our capital, our knowledge, our special skill, any more than is any other man in the community to give his capital, knowledge and skill under like conditions.

It is a curious thing that whenever a reform springs up, the trend is always back to common sense, and after the reform has gotten well under way, we all exclaim, "How obvious and simple, why didn't we think of that before." I thought thus after reading the splendid report of our Committee on the Abuse of Medical Charities and its recommendations. It seems to me that, through this committee, we are now doing as a profession what the rest of the community have long ago done, namely, handing over to a specially trained and prepared organization the investigation and distribution of our charity. Just as the laity have given to such bodies as the United Charities its offerings for intelligent distribution, we now propose to call in the aid of this body of trained workers to help us make our charity of real benefit to the needy in the community. We are only a little behind the rest of the world in this respect. Every man is entitled to his just compensation, and through this committee and the United Charities every man will be able to distribute his charity where it is most needed. (Applause.)

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## FOX RIVER VALLEY MEDICAL ASSOCIATION.

The quarterly meeting of the Fox River Valley Medical Association was held at Elgin, May 11. It began with a clinic at St. Joseph's Hospital at 8 a. m. by Alexander Hugh Ferguson, consisting of a cholecystotomy, a left herniotomy and an amputation of the cervix and perineorrhapy. On account of the earliness of the hour only a few except resident doctors were able to avail themselves of this privilege, but all were present that could see to advantage. The business session convened at 10:30 a. m., with the vice-president, E. H. Abbott, in the chair. Drs. Annie Spencer and R. S. Bothwell, of Batavia, and Martha Hayward and A. L. Anderson, of Aurora, were elected to membership. A resolution was adopted approving the bill before the legislature for the sterilization of criminals and another deprecating the practice of otherwise reputable druggists publishing their personal guarantee of nostrums and patent medicines. A circular letter from the Fenger Memorial Committee was read and the society instructed the treasurer to send $25 as its subscription. It was voted to invite the Aux Plaines Branch of the Chicago Medical Society to meet in joint session again at some place to be selected by the committee. At the conclusion of the business session, Alexander Hugh Ferguson, of Chicago, delivered an address on "Empyema," which commanded the closest attention of the members from beginning to end. The society again convened after an intermission of an hour and a half for luncheon and listened to a most interesting paper on "Acidemia in Its Relation to Nervous Diseases," by George F. Butler, of Chicago. Both Dr. Ferguson and Dr. Butler were unanimously given a vote of thanks and made honorary members of the association.

GEO. F. ALLEN, Secretary.

## ACIDEMIA IN ITS RELATION TO NERVOUS DISEASES.

GEORGE F. BUTLER, M.D., CHICAGO.

The doctrine of autointoxication is a very old one; the central idea of the primitive conception survives in the term rheumatism, applied to a condition due to the autointoxication resultant on suboxidation. Many of the morbid states now regarded as autotoxemic were of old charged to rheums, as the products of rheumatism. Obesity and allied states were placed in the sixteenth century in the nosologic position they occupy to-day. In Sydenham's time the effects of these conditions were even better recognized than during the middle decades of the nineteenth century. Sydenham pointed out that suppressed gout (that is, gout without joint expression) exercised marked influence on the constitution. The body, he remarks, "is not the only sufferer and the dependent condition of the patient is not his worst misfortune. The mind suffers with the body, and which suffers most is hard to say. So much do mind and reason lose energy as energy is lost by the body, so susceptible and vacillating is the temper, such a trouble is the patient to others as well as himself, that a fit of gout is a fit of bad temper. To fear, anxiety and other passions the gouty patient is a continual victim; whilst as the disease departs the mind regains tranquility."

Autointoxication is a broad term; it manifests itself in various ways, and when we speak of autointoxication we think at once of faulty digestion, hepatic insufficiency, imperfect elimination and defective metabolism.

Probably the most common form of autointoxication is what has recently been termed acidemia, a condition of the body in which there is an accumulation and retention of an abnormal amount of certain acid waste products. The mixed twenty-four hour urine is normally acid in reaction, the acidity being due to certain acid salts, principally diacid-sodium phosphate ($NaH_2PO_4$), though other acid salts are usually present but in smaller amounts. The urinary acidity, contrary to the general belief, is not due in the least to the presence of uric acid.

The normal degree of acidity of the urine is from 30 to 40. When the degree is below 30 (the difference between the degree indicated and 30 shows the degree retained in the system, provided alkaline fermentation has not taken place), it indicates either renal insufficiency or excessive suboxidation, producing renal strain. In cases in which the degree of acidity exceeds 40 there is excessively imperfect oxidation, which, irrespective of the types of acid, underlies, as is now generally recognized, severe constitutional stress allied to that of diabetic acidosis.

Harrowers says "the index of urinary acidity undoubtedly varies in direct ratio with the metabolic changes going on in the body. The manufacture, as waste products, in the body cells of acid substances—of which sulphuric acid is probably the most important—must have a decided influence on this factor. In addition to this, certain products of intestinal putrefaction, when absorbed into the blood, are eliminated in the urine and thus serve to increase its degree of acidity. . . . The examination of a large number of specimens leads me to believe that high urinary acidity is associated in a majority of cases with low urea output and with other metabolic disturbances, possibly of the uric acid type, but not necessarily so.

"Again, I have found that high urinary acidity and indicanuria quite frequently are associated, and I begin to believe this high acidity is due to the same conditions causing the presence of indican and the conjugate sulphates. At all events, in patients showing excessively acid urine, bacteriological examination of the feces, in a majority of cases, demonstrates a severe infection within the intestines, together with putrefaction of their contents and the inevitably resulting autotoxemia."

There is probably a close association between a high degree of urinary acidity and intestinal autointoxication as shown by the indicanuria almost always present where there is highly acid urine. Moreover, in these conditions we almost invariably find urea elimination very much reduced.

High urinary acidity, indicanuria and low urea-index are very closely related, and have a definite effect, the one upon the other. In the majority of chronic diseases these conditions exist, especially do we find a marked increase in the

number of acid units eliminated per day in tuberculosis, rheumatism, neurasthenia and many other obscure and abnormal conditions associated with autointoxication.

But as this paper is written with the intention of showing the relationship between acidemia and nervous diseases, I will enter at once upon this phase of the abject.

An abnormal degree of urinary acidity extending over a period of some weeks accounts for many fits of the "blues," ill-temper and mental and physical depression, arthralgia, myalgia, backache, insomnia, neuritis, headache, etc.

The symptoms of acidemia, or the more grave form acidosis, are often those of profound systemic depression, but they likewise present occasionally convulsive and exciting types. Nearly fifty years ago Meynert suggested that epileptic attacks were due to an unstable nervous system acted upon by the accumulation of proteid toxic substance. This view was subsequently corroborated by the researches of Brieger, Bouchard, Fere and others on the toxic state of the urine antecedent to the epileptic state. All the depressed mental states, whether occurring singly or in compound psychoses, like paretic dementia, cyclothymia, katatonia, etc., are attended by suboxidation, as Meynert long ago showed; hence, as Coriah has lately proved, by acid states, acetone, diacetic and B. oxybutyric acid.

There are two factors to be reckoned with in acidemia, the acquired diathesis and the effects on this of increased toxemia.

Making up what is called consciousness are a number of clear conscious states, accompanied by others less clear and by physiologic states which, though not entering into consciousness, are even more potent than the conscious states. These last would be the first affected by acidemia. The morbid irritations resulting therefrom obtrude on consciousness, producing anxiety and uncertainty. These morbid irritations of physiologic states produce the great conditions ordinarily found as a result of acidemia. The first is what the older clinicians called nervous adynamia and ascribed not only to the essential fevers, etc., but also to autotoxemia.

From these two states, the conscious and the psychologic, the first an irritable weakness, the other a deep seated constitutional neurosis, result the various conditions of temporary or protracted disorder charged to acidemia. The two conditions are predisposing factors of almost distinct value. One type disturbs the balance of health so that it is easily upset and easily recovers. In the deeper type a secondary condition to autotoxemia has been engendered, which, like all conditions influenced in their action by causes secondary to a great primary origin, will not yield to treatment of this primary cause alone. This latter condition, like chronic nutritional disturbances, set up by syphilis, by the exanthemata and by other diseases in which the nervous state or the nutritional disturbance remains long after the primary cause has disappeared, acts as a predisposing neurosis.

All these morbid states and prolonged acidemia produce a protracted neuropathy with suspicional and anxious tendencies. This condition mimics all the chronic neuroses and is often taken for them, whence the frequent cures of conditions like tabes by quack systems and medical pretenders. To a certain extent the period of attack gives a complexion to the clinical picture. A very common type between 25 and 45 is a disorder mimicking locomotor ataxia and often accompanied by convulsive attacks. In such cases even physicians not unnaturally give an erroneous prognosis. Lightning-like pains of locomotor ataxia are simulated by temporary darting pain, partly of psychic origin. As the existing autotoxic state aggravates any effect of eye strain and even produces these, in certain cases examination of the eyes often reveals conditions mistaken even by ophthalmologists for the preliminary stages of optic atrophy. As the reflexes are often as exaggerated in this condition as they are in the earlier stages of locomotor ataxia, an error in diagnosis is always possible.

The variations in the mental state of this class of cases requires but little to pass over into the confusional types of insanity, which, indeed, were the earliest

directly charged to autointoxication. The more frequent type presented is that of acute confusional insanity. This was the case with those which Schroeder van der Kolk, decades ago, demonstrated to be due to fecal accumulation in the colon. In some cases melancholia is produced. The urine of these has been found to produce stupor and depression in animals. The urine from confusional cases produces stupid excitement and violence. Exceptionally emotional exaltation may occur, producing extravagant actions, thereby creating a suspicion of paretic dementia. A very frequent type produced by railroad travel aggravating autointoxication is a stupid hallucinatory violence, which disappears in a very few days after rest, the use of alkalies, stimulant enemata and hypnotics. This type often occurs in persons of either sex traveling on their honeymoon.

In many cases charged to mental shock acidemia is the dominant cause, which is often due to the inhibitory effect that mental shock has produced on the liver and kidneys, causing the latter to secrete only the clear, pale urine of nervous agitation. The cases of transitory frenzy, with their wild, brief, unremembered violence, charged to mental shocks, are really due to acidemia in the manner already described.

The most common symptoms of this form of nerve-tire are the very ones which lay tradition and dogmatic empiricism attribute to womb ailment. They are in the usual order of their frequency: Great weariness and more or less nervousness and of wakefulness; inability to walk any distance, and a bearing-down feeling; then headache, napeache and backache. Next comes scant, painful, delayed or suppressed menstruation, cold feet, and an irritable bladder, general spinal and pelvic soreness, and pain in one or both ovaries. The woman, always tired, spends the day tired, goes to bed tired and wakes up tired, often, indeed, more so than when she fell asleep. She sighs a great deal, has low spirits, and often fancies that she will lose her mind. Her arms and legs become numb so frequently that she fears paralysis. The skin becomes dry, harsh and scurfy. Pigmentary deposits appear under the eyes, around the nipples, and on the chin and forehead. Blondes get mottled in complexion. Brunettes are disfigured by brown patches or by general bronzing. Sometimes the whole complexion changes to a darker hue, while a disfiguring growth of hair appears on the face. A physician, especially if the patient has backache, bearing-down feeling, an irritable bladder, and pain in the ovaries, is apt to hunt diligently for a uterine lesion. If one be found, no matter how trifling, he will attach to it undue importance and treat it heroically as the erring organ. If no visible or tangible disease of the sexual organs be discoverable, he will lay the blame on the invisible endomentrium or on the unseeable ovary and continue the local treatment. In this connection it should be remembered that menstruation to a certain extent is eliminative, and that interference with it causes retention of toxic elements.

Even where the bowels seemingly move freely in constipated individuals elimination is very imperfect. The acid urine of these patients causes, as Spallaci long ago discovered, stupor, asthenia, tremor, tetanoid symptoms and hypothermia, followed by hyperthermia when inoculated in animals. Improvement in elimination removes from the urine the factors producing these conditions. The urine of amenorrheic or dysmenorrheic women, and obviously suffering from constipation and having seemingly free movements of the bowels, present similar qualities. Mental states in women or nervous men are peculiarly apt to disturb primarily the genitourinary apparatus and secondarily the hepatic and renal. Thus jealousy often evinces itself first in bladder disturbance, later in slight jaundice and symptoms resembling gallstone colic.

These symptoms, according to Lepine, are very frequent in women and in nervous men after emotional disturbances. They are extreme expressions of acidemia due to emotional disturbance. The fact is generally ignored but none the less clinically evident that nerve-tire and acidemia work in a vicious circle. Here the influence of secondary casual factors, as often ignored in etiologic pathology, is evident. This is peculiarly obvious in nervous conditions due to errors of refraction and curable by proper glasses in an early stage. Here the influence

of acidemia in producing the headaches is shown in disappearance of the symptoms under treatment directed against the acidemia alone. In a class of cases the supraorbital headache of eye strain is combined with vertical and suboccipital headache. Here, although considerable astigmatism is present, all the headaches often disappear under treatment for acidemia. The underlying condition has not been removed, and, unless the astigmatism be treated, will soon cause autointoxication at the proper etiologic moment, attended with recurrence of the headaches.

The same is true of aural, rhinologic, laryngologic and pharyngeal states. Adenoids in children, for example, bring about constitutional disturbances, producing acidemia through continual strain on the nervous organism. The nose, through its erectile tissue, having nerve relation to the erectile sexual systems, and, through the large extent of the olfactory nerve, may be irritated by the attempts at elimination through mucous membranes. This irritation, by exciting the nerves concerned, unduly increases the nerve-tire of the central nervous system and thereby the acidemia. Pathologic sneezing is often an expression of this, and similar influences play a part in the autotoxemic laryngeal and pharyngeal vertiginous states so frequent in autotoxemics. The irritations of these regions often occasion the undue cardiac stress which expresses itself in pseudoanginas. Pelvic irritations of the female produce in a similar manner severe constitutional states. This is why women with severe pelvic disorder who have become insane recover without other treatment than removal from home surroundings and treatment of the acidemia.

The predisposing causes, however, in these aural, laryngologic, rhinologic, pharyngeal and gynecologic conditions remain to set up recurrences of autotoxemia and its consequence if untreated. Preparations for special procedures often imply treatment of autotoxemia which treatment predisposes remarkably to the benefits effected by operation. Very much of what is charged to reflex causes is really due to strain producing acidemia little by little.

The pure type of autotoxemia which underlies many of the so-called reflex states was recognized by the older clinicians as fecal anemia and treated on eliminative and roborant principles. The milder states resultant on acidemia are generally of local expression like irritable bladder, various neuroses, unilateral headache, and neuralgic irritations about the gums and teeth, together with dermatoses like angioneurotic edema and hives, disordered rhino-laryngologic conditions, local fleeting pains, etc. The severe types may vary from fecal anemia to conditions simulating chlorosis, neurasthenia of the ordinary type and of types mimicking tabes, transitory frenzy, melancholia, acute confusional insanity, stupor, amnesia, emotionally exalted states, and sometimes epileptiform attacks resembling grave hysteria, but accompanied with partial or complete loss of consciousness.

One unpleasant and frequent mental state in otherwise logical autotoxemics is nosophobia, or worry over the possibility of disease. This differs from hypochondria in the fact that the subject does not think he has a particular disease, but fears he may have. The irregular action of his organs resulting from acidemia intrudes on his consciousness and causes a fear or uncertainty as to his actual state. That paretic dementia and tabes are often due to the toxin of syphilis is now generally admitted. The clinical history of some cases would indicate that acidemia has here played its part more especially, as it has been demonstrated beyond cavil that temporary autotoxemic neuroses mimic these two great constitutional disorders. The fact is but too often forgotten that the law of periodicity of the nervous system fixes a tendency of certain symptoms to recur from a slighter exciting cause. Hence, frequently recurring acidemia causes that breakdown of the vasomotor balance which constitutes the underlying basis of tabes and paretic dementia.

Owing to the tendency of the neuroses with an underlying vasomotor factor to remit or assume temporary appearances of health, the distinction between the deep forms of acidemia and these neuroses becomes at times difficult. This difficulty is intensified by the fact that acidemia, in a hereditary defective or ac-

quired neuropathic constitution, may cause marked and decided symptoms of less augury than when found in a healthy constitution. Acidemia occurring in puberty often temporarily initiates seemingly serious puberty neuroses and psychoses.

The same is true of the climacteric end of the senile period. In all these cases the condition produced by acidemia has the clinical tinge of the period in which it appears. This is why treatment directed to a change of environment and the habits of the individual so often produces favorable effects on seeming senile and climacteric breakdown.

The grave autointoxication resembling tabes and allied conditions are differentiated, as a rule, by the state of the reflexes as to absence of stupor, melancholia and acute confusional insanity, as well as amnesia, and differ little from the ordinary types except in their comparative quickness of response to treatment. This, however, is only a relative test, since in no case of these affections is autointoxication absent as an etiologic factor. The convulsive types of autointoxication differ from epilepsy in their infrequency and absence of recurrence. Practically the status of the autointoxicated is as brief as that of the epileptic is prolonged.

One phase of acidemia which has received less attention than it deserves is the pseudoangina which so frequently occurs. Sometimes, albeit very rarely, death has occurred from this. This condition is due to the primarily increased inhibition of the heart, succeeded by increased power of the excitomotor ganglia of the heart with resultant irregular action. From this often result the emotional exaltation, depression and suspicional states found in autointoxication of brain and heart. It is readily comprehensible how these irregularities tend to increase each other. Independently of the condition just described, cardiac irregularities occur in acidemia from arterial tension due to the character of the blood. Inevitable renal and hepatic disturbances occur, whence the temporary albuminuria and glycosuria.

The phenomena of arthritis deformans bear a marked resemblance to the trophic changes of tabes, and it is by no means improbable that they are sometimes due to the two states produced by autointoxication. The chronic type has so deranged the trophic mechanism that irritation changes result from the products of autointoxication. The influence of these factors can be shown experimentally by section of the sciatic nerve in rabbits and the injection of irritating material above the center of the body. As a result the side of the sciatic nerve section is attacked by arthritic changes like those of arthritis deformans.

I dislike to close any medical paper without referring to the treatment of the disease under consideration, for, while diagnosis is essential, the ultimate aim of the physician, after all, is the relief or cure of disease.

The therapeutics of acidemic autointoxication will depend on the type. In irritable weakness, while removal from surroundings is desirable for permanent recovery, much may be attained by regulation of diet, proper alkalies, alkaline mineral waters, regular moderate exercise and massage, as well as hydrotherapy. Here, as in all cases of acidemia, the great need of the system is water, and it should be amply supplied, whether in the form of mineral waters or ordinary water, or large quantities of milk. Purgatives require very careful adjustment; both aloetic and the cascara purgatives tend to produce congestion of the hemorrhoidal veins with resultant irritation. Saline laxatives are the best, although in old people they must be used cautiously. In no small number of cases of irritable weakness a small dose of a mercurial followed by a morning saline acts rapidly and very beneficially in securing elimination, which is what is needed, not simple purgation. In the deeper type, removal from home surroundings and conditions is imperatively indicated. In addition to dietetics, of which I will speak in a moment, hydrotherapy, elimination and exercise, faradism and franklinization along the spine are often found necessary and valuable. The indication in this type for the use of water is no less imperative than in the first type. The patient, however, has an intense repugnance to water, as a rule, and to secure its use the physician will need much ingenuity.

The acidity of the urine must be reduced to normal, *i. e.*, 30 to 40 degrees. This is best accomplished by giving thirty to sixty grains of sodium bicarbonate in three-fourths of a glass of water about two hours after eating, say middle forenoon, middle afternoon, and at bedtime. To bring the acidity of the urine down to normal will require from one to four weeks, in some cases even longer. If there is much intestinal decomposition as shown by the presence of indican in the urine, intestinal antiseptics, preferably the sulphocarbolates, are indicated.

A prescription which I have used with great success, suggested by Dr. Eugene S. Talbot, the celebrated dentist and stomatologist, of Chicago, who has done more work along this line than any one else I know of, contains to each dram, 20 grains of sodium bicarbonate, 5 grains sodium sulphate, 2½ grains sodium sulphocarbolate; colchicine, gr. 1/500; juglandin, gr. 1/6; xanthoxylin, gr. 1/6, with cinnamon and other aromatics. This formula is now marketed by the Abbott Alkaloidal Company under the trade name of Sodoxylin.

This prescription is an excellent combination of alkalies, intestinal antiseptics, salines and hepatic stimulants. Of this one-half to one teaspoonful is given in a glass of water two or three hours after eating.

As to diet. There are two factors to be considered, viz., the quantity and the kind of food eaten. The proteids should be greatly reduced, and while each case may have to be treated differently as regards diet, there are a few general rules which are applicable to almost every case. Meats should be replaced by chicken, fish and vegetables. In some cases, those where the acidity is due to sugar fermentation, starchy foods and sugars should not be partaken of. In other cases fruit, both cooked and uncooked, should not be used. It is well to be sparing in the use of water with meals, but plenty of water should be drunk between meals. Coarse foods and not too much at a time must be eaten with sufficient time to masticate and thoroughly insalivate them before swallowing.

# NEWS OF THE STATE

## PERSONAL.

Dr. Hugo Franz has sailed for Europe.

Dr. R. E. Watkins has located at Polo.

Dr. and Mrs. John Ridlon are at Newport.

Dr. Alfred D. Kohn has returned from Europe.

Dr. S. Ida Wright Rogers and son Lyman, of Chicago, have gone to the Pacific coast.

Dr. Frank Billings and Miss Billings, Chicago, have returned from an extended European trip.

Dr. F. H. Langhorst and wife of Chicago will leave shortly for Europe to be gone one year.

Dr. J. R. Sholl has been appointed health commissioner of Peoria, vice Dr. Albert Weil, resigned.

Dr. Joseph P. Smyth has been re-elected high medical examiner of the Catholic Order of Foresters.

Dr. Arthur D. West, Moline, underwent an operation for appendicitis, July 19, at the city hospital.

Dr. R. T. Hinton has succeeded Elmer L. Crouch, resigned, on the staff of the Jacksonville Hospital for the Insane.

Dr. T. W. Bath, Bloomington, has been elected surgeon of the Department of Illinois, United Spanish War Veterans.

Dr. W. R. Shinn, of Chenoa, has sold his practice to Dr. Du Four, of Oquawka, and will make an extended trip through the West.

Dr. J. B. Herrick gave an address at the University of Chicago August 16 in the Oliver Wendell Holmes centenary celebration.

Dr. Harry C. Blankmeyer has been appointed pathologist and Dr. Morris Altman obstetrician on the staff of the Springfield Hospital.

Dr. E. R. Walters, health commissioner, with other officials of Pittsburg, made a trip of inspection of the small parks of Chicago recently.

Dr. and Mrs. William Senn, Dr. and Mrs. George N. Fiske, Dr. C. H. McKenna and Dr. and Mrs. Arthur R. Elliott have sailed for Europe.

Dr. James A. Nolen has succeeded Dr. Frank Fitzgerald, resigned, as local surgeon of Chicago & Northwestern Railway Company at Morristown.

Dr. Edward W. Stubbs, Aurora, physician of Kane County, was slightly injured and his carriage destroyed in a runaway accident in Aurora, July 19.

Dr. and Mrs. Lewis L. McArthur, Dr. and Mrs. Cassius C. Rogers, and Drs. Harriet C. B. Alexander, E. Fletcher Ingals and George Shambaugh have sailed for Europe.

Dr. Charles F. Barstow, Freeport, accused of having performed an illegal operation which caused the death of Miss Janette Reider, was declared not guilty by the jury.

Dr. J. L. Greene, superintendent of the Kankakee Hospital for the Insane, has been appointed the alienist member of the board of administration for the state institutions.

A Fort Wayne (Ind.) paper announces that Dr. Frank Wise Goodell of Effingham, Ill., had reached that city beginning a tour of 20,000 miles to take in all the important states, territories and cities of the United States and Mexico.

Dr. P. W. Ransom, Rockford, who was sued by the *Journal of Nervous and Mental Diseases* to recover $125, alleged to be due on an advertising contract, is said to have won his suit, as the testimony showed that he had ordered the advertisement taken out of the journal.

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## NEWS ITEMS.

A donation of $5,000 has been made by the Illinois Steel Company to the South Chicago Hospital, to be applied toward the payment of the indebtedness.

Dr. M. A. Bingley was recently the victim of strong-arm men while boarding a street car near the Polk Street depot. The robbers made off with a $150 diamond stud.

Dr. J. C. West, of 936 North Halsted Street, Chicago, said to be a lecturer at Rush Medical College, was recently held to the grand jury of Cook County on a serious charge.

Dr. G. E. Tucker, of Mt. Vernon, Ill., while mentally deranged, wandered over the south part of Illinois for six weeks, eluding a searching party of a hundred men and subsisting on berries and fish.

Dr. H. M. Bascum, for many years a practitioner at Ottawa, has been appointed chief surgeon of the Hospital Association of the Illinois Traction System. Dr. Bascum will have his headquarters in Peoria.

Dr. Edwin a Weimer, Pekin, charged with sending an improper letter through the United States mails, plead guilty and is said to have been fined $100 and costs in the United States District Court July 21.

Dr. H. A. Pattison of Benld, Macoupin County, Secretary of the County Society, has sold his property and practice to Dr. H. B. Beson of Paxton. Dr. Pattison will spend a year in Chicago in postgraduate work.

The board of directors of the Norwegian Lutheran Deaconess' Home at a meeting July 13 completed the arrangements for a new $75,000 hospital to be built adjoining the old home at Haddon avenue and Leavitt street.

Parents of a baby found on the doorstep of Dr. W. Austin Code, 749 Warren avenue, Chicago, called to claim the child recently after the doctor had decided to adopt it. No record is had of the name or address of the parents.

Construction work has been begun on the new addition to Wesley Hospital, which is to cost $125,000 and to accommodate about 180 additional patients. The new wing will be ready for occupancy about February next.

The Galesburg hospital board has appointed the following physicians on the staff for the coming year: Drs. J. F. Percy, William O. R. Bradley, William H. Maley, R. C. Matheny, E. N. Nash, D. M. Rice, C. G. Johnson, G. H. Bower, J. H. Bryant, and C. B. Ripley.

Dr. Robert C. Hamilton, of 176 Sedgwick Street, and Mrs. E. S. Schaver, of 46 Oak Street, Chicago, also said to be a graduate physician, were recently arrested upon complaint of the coroner of Cook County on the charge of performing an illegal operation.

Pat Crowe, ex-kidnaper and more recently evangelist, has organized the American Sanitarium Company with a capital of $100,000 to build an institution at Highwood for the care of drunkards and drug habitués. Highwood formerly furnished plenty of subjects for the cure.

At a meeting of the Galesburg Hospital board July 9 the following medical staff was appointed: Drs. J. F. Percy, William O'R. Bradley, William H. Maley, Ralph C. Matheny, Edwin N. Nash, Delia M. Rice, Carl G. Johnson, George S. Bower, John H. Bryant and Clarence B. Ripley.

The addresses of Chicago subscribers to THE JOURNAL have been corrected to correspond with the new house numbers as furnished by R. R. Donnelly & Sons, publishers of the Lakeside Directory, through the courtesy of the American Medical Association. If any mistakes are found, subscribers are requested to send their correct addresses to the Assistant Editor at 4603 Evanston Avenue.

A young scion of a wealthy Chicago family was recently overcome by heat while golfing at a Wisconsin summer resort. The newspapers stated that the family physician was rushed to the scene on a special train, but *mirabile dictu,* failed to mention the physician's name. Does he deserve sympathy or congratulations?

On August 3 the first outdoor school for tuberculous children was opened on the grounds of the Harvard school, West Seventy-Fifth street and Vincennes road, under the joint management of the Board of Education and the Chicago Tuberculosis Institute. The school at first will have thirty pupils, selected from children attending the public school who are found physically subnormal or predisposed to tuberculosis.

By the will of the late Augusta Mannheimer, widow of Dr. M. Mannheimer, $10,000 is bequeathed to the United Hebrew Charities for the benefit of the Michael Reese Hospital, with the suggestion that a contagious ward for children be maintained; $2,500 is bequeathed to the

Alexian Brothers' Hospital, and all Dr. Mannheimer's medical books are given to Rush Medical College, together with a bequest of $5,000 for the establishment of a library to be named after the testator's husband.

Free medical examination of applicants for civil service positions in Springfield does not appeal either to Dr. Palmer, the superintendent of the board of health, or to Mayor Schnepp. The commissioners believe that that section of the civil service law which states examinations shall be "free and open" means that no fee shall be charged for physical examination. The mayor differs, however, in his interpretation of the act, and holds that "free and open" simply means that everybody properly qualified shall have equal right to take examinations.

Chicago is always blowing its horn as the great summer resort, but now comes Dr. Kreider and claims that Springfield is the only genuine health resort within a thousand miles and has all others distanced in the race. The only damaging admission he makes is: "It is true that for a few days in the summer there is considerable heat and humidity." The following is the summary of a lecture delivered before the members of the Chamber of Commerce on "Springfield as a Health Resort," as reported in the *State Register*, July 23, 1909:

"Altogether, Springfield, which will soon be the central point of civilized America, offers to its dwellers every advantage possessed by any other community within a thousand miles and many advantages from a health point possessed by no other city in any clime in any country. We can, therefore, proclaim to the world that our city is the health resort of all others, and can with good conscience invite intelligent people of every clime and nationality to make their homes with us."

Dr. Kreider brought out the many advantages of the city, as its freedom from contagion, a city of good homes, well heated and lighted; of healthful water supply; excellent pleasure parks, miles of good pavement; a city of modern buildings, and ample fire protection.

The Appellate Court in June reversed a judgment in the Circuit Court awarding $100,000 to Dr. L. C. H. E. Zeigler against the estate of Mrs. Harriet G. McVicker, widow of J. H. McVicker, a pioneer in the theatrical business in Chicago. Presiding Justice Holdom read the opinion, which held that the contract providing for the payment of the money at Mrs. McVicker's death was contrary to public policy and therefore void.

Dr. Zeigler is an osteopath and met Mrs. McVicker when she was 79 years old.

After defining "wagering contracts" the court said:

"We do not think the contract here is so akin to the cases of insurance referred to as comes within the designation of a wagering contract. Enforcement of the contract depends on whether it is void as being against public policy."

The court says there is no evidence that Dr. Zeigler betrayed the confidence reposed in him or that he did not do everything to prolong her life.

"But," the opinion continues, "whatever may have been his course of conduct toward her, Zeigler's rights must be admeasured in harmony with the obligations and duties which the law exacts of persons, bearing the relationship of doctor and patient, in their dealings with each other. A fiduciary and confidential relationship between Zeigler and Mrs. McVicker is clearly established.

"We find a contract to furnish medical services by a young osteopath practitioner, only recently graduated, whose usual and customary charge was $2 per treatment, to an octogenarian woman in feeble health, as long as she might live, at the extravagant remuneration of $100,000.

"The policy of the law is not to sanction the putting of a party in a position where he is subject to the temptation to do wrong in serving his own interests, which, as in the case at bar, is to hasten death rather than to prolong life. It can not be gainsaid but that the early demise of Mrs. McVicker was to the financial interest of Zeigler, for on the happening of that event, if the contract should be upheld, he would be entitled to receive from her estate the sum of $100,000."

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## PUBLIC HEALTH.

At a meeting of the Illinois State Board of Health April 14 the National Medical University is said again to have been voted a college not in good standing.

Dr. Robert J. Burns, former health commissioner of Freeport, has been elected county physician on a bid of $240 for the year. Dr. White received $450 for the work last year, but did not submit a bid this year.

The Chicago Tuberculosis Institute has opened its eighth free dispensary. The new station is connected with Gad's Hill Center, located at Robey and West Twentieth Streets. For the present it will be open from 10 to 12 Wednesdays and Saturdays.

Harvard University has secured Dr. Milton J. Rosenau, now director of the Hygienic Laboratory of the United States Public Health and Marine-Hospital Service, as head of the new department and professor of hygiene and preventive medicine.

The Great Northern Road is said to have placed vacuum cleaners on its through Pullman cars on account of the number of travelers with pulmonary trouble. Cleaning by the vacuum process without raising any dust will be a great improvement, besides allowing the cars to be kept clean en route.

The emergency ward of the Blessing Hospital in Quincy is said to have received the most favorable attention and comment from the members of the State Medical Society during the recent meeting. It occupies a building erected last year and provides accommodations for two contagious diseases.

Capt. J. T. Siler, assistant surgeon in the United States army, and Dr. Lavender, assistant surgeon in the United States Public Health and Marine-Hospital Service, have been detailed to make an exhaustive study of pellagra at the Illinois General Insane Asylum, in South Bartonville. It is said that 50 of the 2,000 insane patients are afflicted with this disease.

Dr. Albert N. Mueller, health commissioner of Rock Island, has inaugurated a vigorous campaign for sanitary improvement of that city. The health department is to take over the superintendence of the collection of garbage and of the work of the plumbing inspector. Special investigations of cases of typhoid and tuberculosis are made, and maps are used to indicate the location of the cases.

The health department has appointed the following ten physicians to cooperate with the United Charities and Infants' Welfare Committee in their endeavor to reduce the infant mortality list of the summer: Drs. Caroline Hedger, Anna Dwyer, Katherine B. Rich, Johanna Tow, T. Grant Allen, Harold Diefenderfer, M. A. Bernstein, Samuel Perlstein, Samuel Kalaginski and Henry Steible. Five big tents where ailing babies may be cared for have been placed in various parts of the city in crowded districts.

Dr. Davy, in his presidential address to the British Medical Association, said: "My predecessor told me that fifty years ago his average income from attendance on cases of typhoid was £300 ($1,500) a year. For the past few years my income from that source has hardly averaged five guineas." This statement, as bearing on the decreasing income of English physicians, is being used in a circular by a branch of the British Medical Association to discourage young men from entering the overcrowded profession.

It is said that the Chicago Garment Manufacturers' Association, on the suggestion of its president, Mr. Sol H. Shoninger, is considering the feasibility of the construction of a model group of manufactories, covering perhaps forty acres, where working conditions will be the best possible and the surroundings beautiful as well as healthful. Much has been accomplished by Mr. Davies, the state factory inspector, to curb the evils of so-called sweat-shop labor, but there is no doubt room for vast and urgently needed improvement in the conditions surrounding the manufacture of clothing.

A circular letter recently addressed to more than a score of the leading medical colleges in the United States requesting information about the course of study offered in state medicine revealed a sad lack of uniformity in the treatment of the subject. Several college secretaries even declared their ignorance of the subject. A few others have very complete instruction assigned to the chair of hygiene or of medical jurisprudence. Among the notable recent appointments to chairs in this specialty may be mentioned Dr. Charles J. Whalen, assistant professor of medicine in Rush, former commissioner of health of Chicago, who will lecture on state medicine beginning with the fall term.

The Provident Savings Life Assurance Society of New York has established a bureau to guard the health of its policy holders by means of health bulletins and free medical examinations every two years for those who desire the examination. No medical treatment is contemplated by the company, but an effort will be made to discover the occur-

rence of disease early so that treatment by the family physician may be effective. That the insurance companies', as well as the policy holders', interests can be promoted by the diffusion of sanitary knowledge is thus recognized and endorsed by official action. The Metropolitan Life Insurance Company has recognized the same truth in its campaign against tuberculosis.

The Bulletin of the Department of Health of Chicago, beginning July 31, has been publishing the results of the bacterial count of samples of raw and pasteurized milk as obtained by the inspectors from various sources, together with a study of the infant and typhoid mortality from the standpoint of raw and pasteurized milk. The bacterial count has been found running from six to thirteen times as high in raw as in pasteurized milk. July had the lowest death rate ever recorded for that month in Chicago and the fourth lowest for any month in fifty years, 11.62 per 1,000. The deaths of infants under one year of age was only 423, as compared with 662 in July, 1908. The department has published the following spot maps, showing the location of cases and deaths, together with texts giving advice on infant feeding, sanitation, etc., and has distributed them among the clergy, settlement workers and others who can use them in welfare work:

1. What Kills the Babies?—Diagram.
2. Where the Babies Die—Map of deaths under 1 year, August, 1908.
3. Where the Babies Die from Diarrheal Diseases—Map of August, 1908.
4. Diphtheria in Chicago—Map of December, 1908.
5. Scarlet Fever in Chicago—Map of November, 1908.
6. Typhoid in Chicago—Map of October, 1908.
7. Consumption in Chicago—Map of Library, 1909.

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## MEDICAL SOCIETY NOTE.

The Stephenson County Medical Society held its annual meeting at Freeport July 8. Dr. G. E. Mershon, of Mount Carroll, gave an address on "The Practice of Medicine from a Business Viewpoint." The annual election of officers resulted as follows: President, Dr. A. E. Smith; vice-president, Dr. B. Erp Brokhausen; treasurer, Dr. D. C. L. Mease; secretary, Dr. J. Sheldon Clark; member of board of censors, Dr. Allen Salter; delegate to state meeting, Dr. B. A. Arnold; alternate, Dr. W. A. Hutchins.

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## NEW INCORPORATION.

Dr. Boyd & Co., Chicago; capital, $2,400; manufacturers and dealers in drugs and medicine; B. Y. Boyd, H. W. Baskette, W. B. Sim.

## REMOVAL.

Dr. Loren Orr, of Hull, has bought the practice of Dr. W. S. Taylor and removed to Tallula.

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## MARRIAGES.

FRANK TALIAFORD, M.D., Mazon, Ill., to Miss Dora Orinda Bennett, of Carlisle, Ohio, at Chicago, July 21.

THOMAS POLLOCK RANNEY, M.D., Chicago, to Miss Bertha Kuehn of Eleveth, Minn., at Duluth, June 26.

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## DEATHS.

GEORGE T. CARPENTER, M.D., Rush Medical College, Chicago, 1880; of Chicago; died at Buchanan, Mich., July 20, aged 61.

JAMES MCRUERK, M.D., McDowell Medical College, St. Louis, 1852; died at his home in Willisville, Ill., from senile debility, aged 84 years.

SARA L. VALENTINE, M.D., Hahnemann Medical College, Chicago, 1887; died at her home in Chicago, July 25, from chronic nephritis, aged 66.

YEWELL DALTON SCALES, M.D., of Springfield, Ill.; died in St. John's Hospital, Springfield, July 21, from cerebral hemorrhage, aged 65.

GEORGE W. BRIGGS, M.D. College of Physicians and Surgeons, Keokuk, Iowa, 1876; formerly of Chapin, Ill.; died at his home near St. James, Mo., July 25, from nephritis.

W. THURMAN, M.D., of Detroit, Pike County, Illinois, died Aug. 1, 1909, aged 55. Dr. Thurman had resided in Detroit one year, practicing previous to that time in Grafton.

JOHN W. MILLER, M.D., American Medical College (Eclectic), St. Louis, 1887; (license, Ill.; years of practice, 1888); of Madison, Ill.; died in Edwardsville recently, aged 71.

ROBERT MASTERS WILSON, M.D., Long Island College Hospital, Brooklyn, N. Y., 1873; of Lincoln, Ill.; died at St. Clara's Hospital of that place, July 27, from cholelithiasis, aged 52.

JULIUS NELSON FRASER, M.D. Laval University, Montreal, 1874; of Kankakee, Ill.; died at the West Side Hospital, Chicago, July 27, from tuberculosis, after a surgical operation, aged 67.

A. G. KINKEAD, M.D. (license, Illinois, years of practice, 1878), who had practiced for fifty years in Green and Macoupin Counties and twenty-five years at Greenfield, died in that city July 23. Dr. Kinkead was a surgeon at Camp Butler during the war.

SARAH HACKETT STEVENSON, M.D. Northwestern University Medical School, Chicago, 1874; a member of the American Medical Association till her enforced retirement through illness; died at St. Elizabeth's Hospital, from paralysis, after an illness of three years, August 14, aged 64. Dr. Stevenson was a member of the Chicago Woman's Club and the

SARAH HACKETT STEVENSON, M.D.

(COURTESY OF THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.)

Twentieth Century and Fortnightly clubs. She had been a member of the Illinois State Board of Health; professor of obstetrics at the Woman's Medical College; attending gynecologist to Cook County Hospital, and was on the attending staffs of the Mary Thompson, Frances Willard and Maternity hospitals.

MRS. LIZZIE E. MARSEY, wife of Dr. M. S. Marsey of Peoria, died July 12, 1909, after a brief illness, from paralysis, aged 53 years. The remains were taken to her old home at Cape May, N. J., for interment.

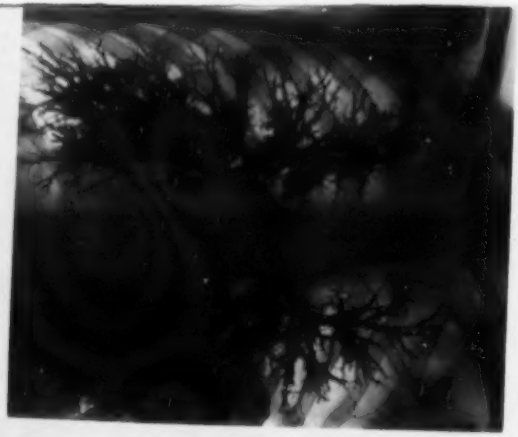
ROBERT J. CHRISTIE, M.D., University of Pennsylvania, Philadelphia, 1856, a member of the Illinois Medical Society; formerly dean and professor of medicine in the Chaddock School of Medicine, Quincy, Ill., died at his home in Quincy, July 27, from cholelithiasis, aged 78.

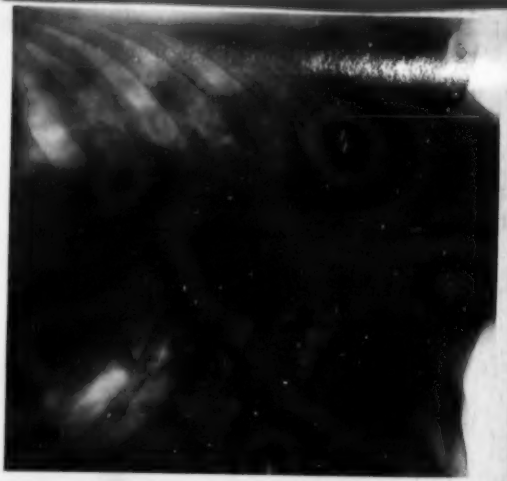
ROBERT LUMLEY, M.D. Rush Medical College, Chicago, 1895; a member of the Illinois State Medical Society; secretary of the Iroquois-Ford Medical Society; secretary of the Board of Health of Watseka, and state examiner for the blind; died suddenly from heart disease, in Watseka, July 13, aged 47.

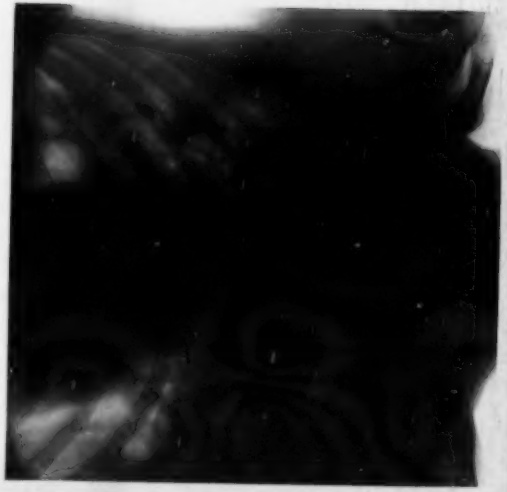
JACOB MOYER HAGEY, M.D., Rush Medical College, Chicago, 1862; for many years a member of the American Medical Association; once president of the Livingston County (Ill.) Medical Society; a member of the American Public Health Association; died at his home in Mount Morris, N. Y., August 3, from cerebral hemorrhage, aged 76.

VICTOR J. BACCUS, M.D., Northwestern University Medical School, Chicago, 1898; a member of the American Medical Association; professor of gynecology in Reliance Medical College; formerly professor of surgery and head of the surgical department of the American College of Medicine and Surgery; surgeon to Frances Willard Hospital; died at the Policlinic Hospital, Chicago, August 10, after a long illness, aged 38.

ROBERT M. WILSON, M.D. Long Island College Hospital, 1873; a practitioner of Lincoln, Ill., for thirty-five years; died July 27 of cholelithiasis after an illness of twenty-four hours. Dr. Wilson was born in Morgan County, Illinois, entered the army at the age of 15 years as a drummer-boy, studied medicine and graduated at Ann Arbor, and took special courses at Rush and Long Island College of Medicine. Dr. Wilson had a long and honorable career in Lincoln and was connected with the City Physicians' Club, the Brainard District and Illinois State Medical Societies.







## Fig. 1. Active Tuberculosis

**Illustrating Article of Emil G. Beck, Chicago**

By viewing this stereoscopic radiograph through a hand stereoscope we obtain a plastic picture of the chest of a person in the advanced stage of tuberculosis. Both lungs are densely studded with tubercular areas. The shadows on a single plate appear in one plane and thus seem to invade the entire lung tissue. Through the stereoscope we obtain a correct optical view. Here the shadows are separated and seen in their respective depths within the chest, appearing like solid bodies surrounded by a halo and imbedded in lung tissue. This active form of tuberculosis is easily differentiated from the post tubercular state, where the fibrous scars stand out distinctly like spiders surrounded by clear lung tissue.



## Fig. 5. Bronchial Tree injected with Bismuth Paste

**Illustrating Article by Emil G. Beck, Chicago**

By viewing this Stereo-radiograph through a hand stereoscope one obtains a true reproduction of the bronchial tree, in plastic effect, which clealry marks its relations to other structures within the chest.

The division of the trachea takes place opposite the sixth vertebra. Exact measurements show that the right bronchus divides at an angle of 17°, and the left at 40° from the line of the trachea.

The number of subdivisions in the bronchi vary from 6 to 10, those running to the lower lobes having more subdivisions.

The bronchiols appear somewhat beaded, due probably to overdistension by the injected bismuth paste. Even the smallest bronchiols, and in a few cases the air vesicles, have been injected, the latter resembling small bunches of cauliflower placed at the ends of the bronchiols.

This radiograph also demonstrates that the liquified paste will enter very minute channels.